Final Environmental Impact Statement for Proposed Habitat Conservation Plan and Incidental Take Permit

MidAmerican Energy Company
Wind Energy Facility Portfolio
Iowa

U.S. Fish and Wildlife Service
Iowa – Illinois Field Office
1511 47th Avenue
Moline, IL 61265

Estimated Total Costs Associated with Developing and Producing this EIS
$498,000

September 6, 2019

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED HABITAT CONSERVATION PLAN AND INCIDENTAL TAKE PERMIT

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COVER SHEET

a. Title: Proposed Habitat Conservation Plan and Incidental Take Permit for the MidAmerican Energy Company, Iowa Wind Energy Facility Portfolio

b. Subject: Final Environmental Impact Statement

c. Lead Agency: United States Fish and Wildlife Service (Service)

d. Abstract: The permit applicant, MidAmerican Energy Company (MEC), is seeking an Incidental Take Permit (ITP) for MEC's wind energy facility portfolio in the state of Iowa. MidAmerican Energy currently operates 22 Projects in Iowa, consisting of 2,021 turbines that vary by type and project. All projects and turbines are within the range of the northern long-eared bat (*Myotis septentrionalis*), little brown bat (*Myotis lucifugus*), tri-colored bat (*Perimyotis subflavus*), and bald eagle (*Haliaeetus leucocephalus*). Four projects have turbines within the Indiana bat *(Myotis sodalis)* range (375 turbines). MEC is seeking incidental take coverage for covered species take associated with the 22 wind energy projects that they own and operate within the state of Iowa.

The Service received an application for an ITP from MEC for the 22 covered projects on April 12, 2018. Species that would be covered under the ITP include the federally-endangered Indiana bat, federally-threatened northern long-eared bat, the non-listed little brown bat, the non-listed tri-colored bat, and the bald eagle, which is not listed under the Endangered Species Act (ESA), but is protected under the Bald and Golden Eagle Protection Act (BGEPA). As part of this application, MEC has developed a Habitat Conservation Plan (HCP) to ensure that impacts to the covered species are adequately minimized and mitigated in accordance with the requirements of section 10 of the ESA.

On August 31, 2018, the Service published a notice in the Federal Register stating the availability of the Draft Environmental Impact Statement (DEIS) and Draft Habitat Conservation Plan (DHCP). The public comment period for the above-mentioned documents expired at 11:59 pm Eastern Time on October 15, 2018, for comments submitted online. Hard copy comments received or postmarked on or before October 15, 2018, were accepted. Comments received during the public comment period and Service responses to those comments are included in Appendix E of this Final Environmental Impact Statement (FEIS). A summary of the changes made to the DEIS in preparation of this FEIS is included in Appendix F.

After the DEIS was made available to the public, post-construction monitoring fatality estimates from the 2016-2017 monitoring season for

Adams, Ida Grove, and O'Brien became available. The data has been incorporated into the FEIS.

The proposed ITP would be a 30-year permit for incidental take of the Indiana bat, northern long-eared bat, bald eagle, little brown bat, and tri-colored bat, if the MidAmerican HCP meets all the section 10(a)(1)(B) permit issuance criteria. The permit would authorize the take of these species incidental to the applicant's operation of wind projects.

The Service has selected MEC's HCP Alternative as the preferred alternative. Of the alternatives evaluated in this FEIS, this alternative best fulfills the agency's statutory mission and responsibilities while meeting the purpose and need.

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f. Transmittal:

This FEIS was prepared by Service staff on the proposed HCP and ITP for the federally-endangered Indiana bat, federally-threatened northern long-eared bat, the non-listed little brown bat, the non-listed tri-colored bat, and the bald eagle, which is not ESA-listed but is protected under the BGEPA, for the MEC wind energy facility portfolio. It is being made available to the public in October 2019.

The Service's decision on issuance of the permit will occur no sooner than 30 days after the publication of the notice of the FEIS in the Federal Register and will be documented in a Record of Decision.

You may obtain copies of the FEIS and related documents on the Internet at *http://www.regulations.gov* (**Docket Number FWS-R3-ES-2018-0037)**.

You may obtain the documents by mail from the Illinois-Iowa Field Office (see contact information above**)** or the Midwest Regional Office.

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1.0 PURPOSE AND NEED, PROPOSED ACTION

1.1 PURPOSE AND NEED

The United States Fish and Wildlife Service (Service or USFWS) received an application for an incidental take permit (ITP) from MidAmerican Energy Company (MEC or Applicant) for the 22 covered projects dated April 10, 2018. Species that would be covered under the ITP include the federally-endangered Indiana bat *(Myotis sodalis),* federally-threatened northern long-eared bat (*Myotis septentrionalis*), the non-listed little brown bat (*Myotis lucifugus*), the non-listed tri-colored bat (*Perimyotis subflavus*), and the bald eagle (*Haliaeetus leucocephalus*), which is not listed under the Endangered Species Act (ESA), but is protected under the Bald and Golden Eagle Protection Act (BGEPA). As part of this application, MEC has developed a HCP to ensure that impacts to covered species are adequately minimized and mitigated in accordance with the requirements of section 10 of the ESA. The ITP would authorize the incidental take of these species during the operation of MEC's 22 covered projects and mitigation implementation located across Iowa.

Section 10 of the ESA allows for "incidental take" of endangered and threatened species or wildlife by non-Federal entities (16 U.S.C. 1539). Incidental take is defined by the ESA regulations as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 C.F.R. 17.3). Under section 10 of the ESA, the Secretary of the Interior may, where appropriate, authorize the taking of federally-listed fish or wildlife if such taking occurs incidentally to otherwise legal activities. The Service was charged with regulating the incidental taking of listed species under its jurisdiction, and section 10 of the ESA specifically directs the Service to issue an ITP to non-Federal entities for incidental take of endangered and threatened species when the criteria in section 10(a)(2)(B) are satisfied by the applicant. Once we receive an application for an incidental take permit, we need to review the application to determine if it meets issuance criteria. We also need to ensure that issuance of the ITP and implementation of the Habitat Conservation Plan (HCP) complies with other applicable Federal laws and regulations.

The Service's purpose in considering the proposed action is to fulfill our authority under the ESA, and section 10(a)(1)(B). More specifically, the Service's purpose for the proposed action is to respond to an application from MEC requesting an ITP for the incidental take of the federally-endangered Indiana bat, federally-threatened northern long-eared bat, little brown bat, tri-colored bat, and the bald eagle, pursuant to the ESA section 10(a)(1)(B) and its implementing regulations and policies, and the BGEPA. The permit decision should ensure that the issuance of the ITP and the implementation of the HCP provide for the long-term conservation of the covered species and their ecosystems in the plan area.

This Final Environmental Impact Statement (FEIS) has been prepared by the Service pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. § 4321 *et seq.* to inform the public of the proposed action and the effects of the proposed action and its alternatives, and to use information collected and analyzed to make informed decisions concerning this incidental take permit application. The EIS evaluates the effects of issuing an ITP pursuant to section 10(a)(1)(B) of the federal Endangered Species

Act of 1973, as amended (ESA), 16 U.S.C. §§1531, 1539 for covered activities associated with the applicant's wind energy facility portfolio (the covered projects include 22 existing projects; see Section 1.2).

1.2 PROPOSED ACTION

1.2.1 Covered Activities and Scope

The proposed action is issuance of an ITP by the Service pursuant to the provisions of section 10(a)(1)(B) of the ESA, which would authorize the incidental take of the federally-endangered Indiana bat, federally-threatened northern long-eared bat, the little brown bat, tri-colored bat, and bald eagle resulting from the operation of MEC's 22 covered projects.

MEC is an integrated electric utility that operates and maintains electric generation and electric and natural gas transmission and distribution assets. MEC has installed more than 4,000 megawatts (MW) of wind generation capacity in Iowa and continues to develop wind projects across the state. MEC is seeking incidental take coverage for covered species take associated with 22 wind energy projects that they own and operate within the state of Iowa (Table 1.2-1). Further descriptions of the projects can be found in Section 2 of the applicant's HCP.

The Service does not authorize the siting, construction, repowering, or operations of wind energy facilities. Rather, an ITP from the Service provides an applicant with incidental take coverage for listed species under the ESA for lawful activities. The only project activities for which the applicant has requested take coverage are project operations and proposed mitigation activities for the covered species. In their HCP, MEC has committed to measures for construction, repowering, maintenance, and decommissioning that will avoid take of other federally-listed species from these activities (see MEC Bird and Bat Conservation Strategy [BBCS]; and Section 5.3 of the HCP). As required by the NEPA, this FEIS will evaluate the effects on the human environment of the issuance of the permit and the implementation of the associated HCP. Specifically, this FEIS evaluates the effects of the change in operations of MEC's 22 covered projects and implementation of mitigation for take as a result of the issuance of the ITP, as well as alternatives to the take.

Table 1.2-1. Summary of covered projects within MidAmerican Energy Company's (MEC) existing wind energy portfolio in the state of Iowa.

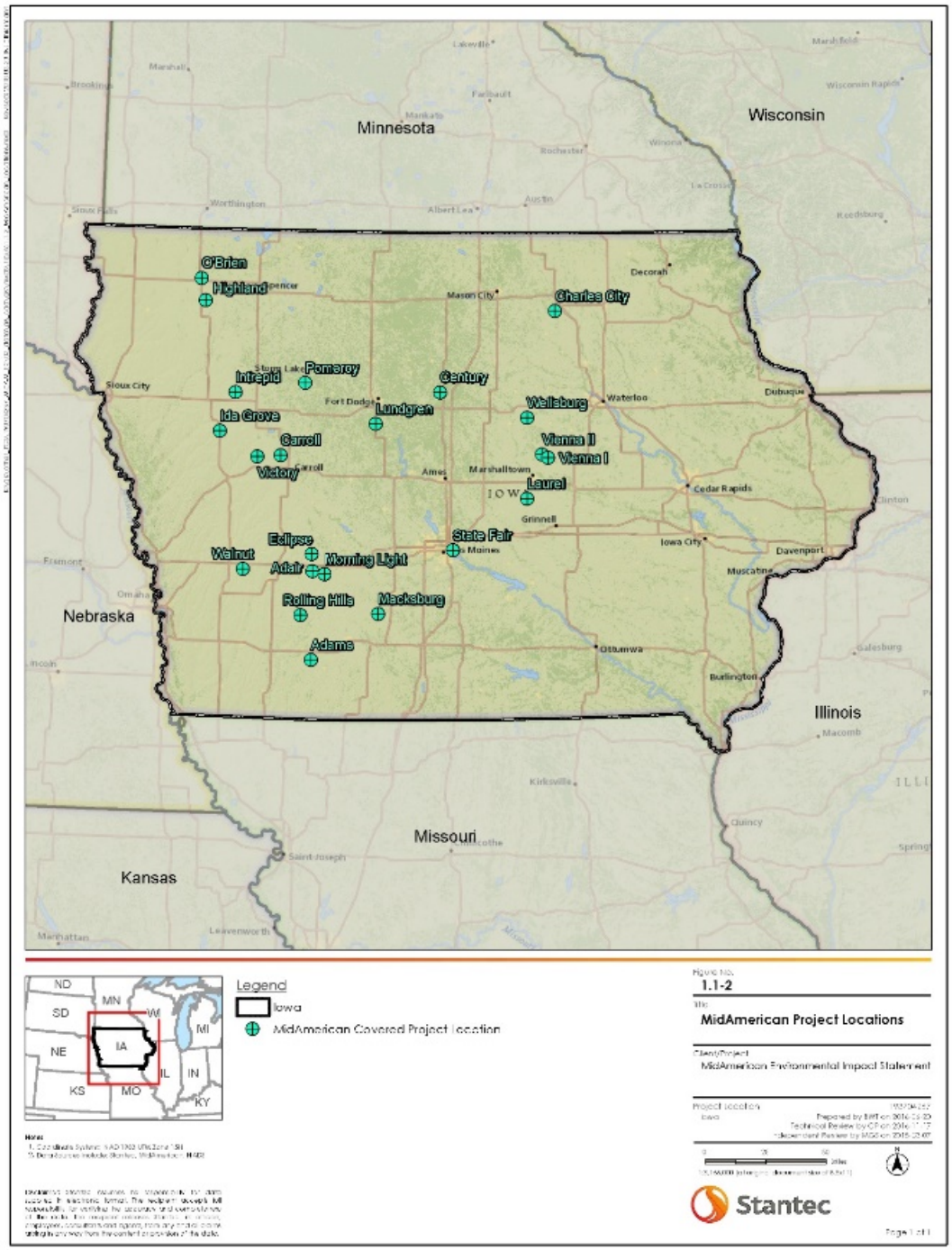
Facility	Year Constructed	Turbines	Turbine Size (MW)	Total Megawatts (MW)	Cut-in Speed[1] (m/s)
Adair	2008	76	2.3	174.8	4.0
Adams	2016	65	2.3/2.4	154.3	3.0
Carroll	2008	100	1.5	150.0	3.5
Century	2005, 2007	145	1.5/1.0	200.0	2.5-4.0
Charles City	2008	50	1.5	75.0	3.5
Eclipse	2012	87	2.3	200.1	3.0-4.0

Facility	Year Constructed	Turbines	Turbine Size (MW)	Total Megawatts (MW)	Cut-in Speed[1] (m/s)
Highland	2015	214	2.3	502.0	3.0
Ida Grove	2016	134	1.8/2.3	301.1	3.0-3.5
Intrepid	2004, 2005	122	1.5/1.0	175.5	2.5-4.0
Laurel	2011	52	2.3	119.6	3.0-4.0
Lundgren	2014	107	2.3	251.0	3.0
Macksburg	2014	51	2.3	119.6	3.0
Morning Light	2012	44	2.3	101.2	3.0-4.0
O'Brien	2016	104	2.3/2.4	250.3	3.0
Pomeroy	2007, 2008, 2011	184	1.5/2.3	286.4	3.0-4.0
Rolling Hills	2011	193	2.3	443.9	3.0-4.0
State Fair Turbine	2007	1	0.5	0.5	4.5
Victory	2006	66	1.5	99.0	3.5
Vienna I	2012	45	2.3	105.6	3.0
Vienna II	2013	19	2.3	44.6	3.0
Walnut	2008	102	1.5	153.0	3.5
Wellsburg	2014	60	2.3	140.8	4.0
Total	*n/a*	2,021	*n/a*	4,048.3	*n/a*

[1] Commercial operations of the 22 covered projects includes the operation of 2,021 turbines.

Each turbine is connected to, monitored by, and controlled by a Supervisory Control and Data Acquisition (SCADA) system to ensure operations are proceeding efficiently. Turbines begin generating power at their manufacturer's rated cut-in speed, and turbines stop rotating and producing power at their cut-out speed. Under normal operations, turbines may begin rotating at speeds less than their manufacturer's rated cut-in speed to enhance generator synchronization and to keep turbine components lubricated, warm, and ready. This rotation is minimized if the turbines are programmed to feather below the manufacturer's cut-in speed.

Figure 1.2-1. MidAmerican Project Locations



1.3 REGULATORY AND LEGAL FRAMEWORK

1.3.1 National Environmental Policy Act (NEPA)

The NEPA of 1969, as amended, 42 U.S.C. § 4321, *et seq*., requires federal agencies to evaluate and disclose the effects of their proposed actions on the natural and human environment. The NEPA process is intended to help federal agencies make decisions that are based on an understanding of potential environmental consequences and take actions that protect, restore, and enhance the environment. NEPA regulations provide the direction to achieve that purpose.

NEPA implementation requires that every federal agency prepare an EIS for proposed legislation or other federal actions "significantly affecting the quality of the human environment" (42 U.S.C. § 4332). The Service, as the Lead Federal Agency, has determined that an EIS is appropriate to analyze the effects of the proposed action on the natural and human environment. This EIS addresses potential effects associated with the proposed issuance of an ITP, which would include the implementation of the HCP and related mitigation. In accordance with NEPA, this EIS evaluates alternatives to the proposed action and also addresses a "no-action" alternative, which provides an assessment of future conditions in the absence of the proposed federal action (i.e., issuance of the ITP).

1.3.2 Federal Endangered Species Act (ESA)

The ESA is administered by the USFWS and National Marine Fisheries Service (NMFS). The purpose of the ESA is to provide a means whereby the ecosystems upon which threatened and endangered species depend may be conserved and to provide a program for the conservation of such threatened and endangered species. Section 9 of the ESA prohibits the unauthorized "take" of any fish or wildlife species listed under the ESA as endangered (16 U.S.C.§ 1538). Under Federal regulation, take of fish or wildlife species listed as threatened is also prohibited unless otherwise specifically authorized by regulation (50 C.F.R. 17.31). "Take", as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. § 1532(19)).

Under section 10 of the ESA, the Secretary of the Interior and Secretary of Commerce may, where appropriate, authorize the taking of federally-listed fish or wildlife if such taking occurs incidentally to otherwise legal activities. The Service is charged with regulating the incidental taking of listed species under its jurisdiction. The submission of the ESA section 10(a)(1)(B) permit application requires the development of an HCP designed to ensure the continued existence (i.e., the taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild), while allowing for any limited, incidental take of the species that might occur during the construction and operation of the project, or during mitigation activities. The implementing regulations for section 10(a)(1)(B) of the ESA, as provided in 50 C.F.R. 17.22, specify the requirements for obtaining a permit allowing the incidental take of listed species pursuant to otherwise lawful activities.

1.3.3 Bald and Golden Eagle Protection Act (BGEPA)

The Bald and Golden Eagle Protection Act of 1940 (BGEPA), 16 U.S.C. § 668, *et seq*., provides specific legal protection to bald eagles and golden eagles (*Aquila chrysaetos*) 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" (16 U.S.C. 668c.). On September 11, 2009, the Service published a final rule (Eagle Permit Rule) under the BGEPA authorizing limited issuance of permits to take bald eagles and golden eagles ''for the protection of . . .other interests in any particular locality'' where the take is compatible with the preservation of the bald eagle and the golden eagle, is associated with and not the purpose of an otherwise lawful activity, and cannot practicably be avoided (74 FR 46836-46879). This rule was revised and finalized on December 16, 2016 (2016 Eagle Rule; 81 FR 91494-91554). On May 2, 2013, the Service announced the availability of the Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy, Version 2[1] (ECPG, USFWS 2013; 78 FR 25758). The ECPG interprets and clarifies the permit requirements in the regulations at 50 CFR[2] 22.26 and 22.27, and it does not impose any binding requirements beyond those specified in the regulations.

1.4 SCOPING AND PUBLIC INTERACTION

NEPA regulations (40 C.F.R. 1501) and USFWS guidelines (550 FW 2.3) specifically define the need for a public scoping process when supporting an EIS. The scoping process is an open public process initiated prior to the preparation of an EIS and is a crucial step in the early planning stage of an environmental document. The objectives of scoping are to identify issues and to translate these into the purpose of the action, the needs for the action, the action or actions to be taken, the alternatives to be considered in detail, the alternatives not to be considered in detail, and the impacts to be addressed. Scoping is used to design the EIS, and, if effective, should reduce paperwork, delays, and costs and improve the effectiveness of the NEPA process. Scoping is a public participation process that begins with the publication in the Federal Register (FR) of the Notice of Intent (NOI) to prepare an EIS.

On April 28, 2016, the Service published a NOI in the Federal Register to solicit feedback from potentially affected federal, state, and local agencies, tribes, and the public in determining the scope of this EIS (81 FR 25414-25417). Publication and distribution of the NOI initiated the process of public scoping for this EIS. Public scoping meetings were held on May 17, 2016, in Council Bluffs, Iowa, and on May 18, 2016, in Ankeny, Iowa. A Service website[3] was created to provide agencies and the public with information related to the project, and online webinars were held on May 10, 2016, and May 23, 2016. The scoping period closed on May 31, 2016.

On May 10, 2016, a postcard was sent via the United States Postal Service (USPS) to affected landowners and lessees identified by MEC. On May 11, 2016, a letter was sent via the USPS to county, state, and federal agencies and non-governmental organizations (NGOs) informing them that the Service was initiating scoping for development of this EIS. A scoping notice letter was also sent to any Native

[1] http://www.fws.gov/windenergy/PDF/Eagle%20Conservation%20Plan%20Guidance-Module%201.pdf
[2] Code of Federal Regulations (CFR)
[3] http://www.fws.gov/midwest/rockisland/te/MidAmericanHCP.html

American tribes that had previously expressed an interest in any part(s) of Iowa, as well as an e-mail regarding the scoping webinar (sent on May 19, 2016). In addition, a public notice was published in the Des Moines Register from May 12, 2016, through May 18, 2016, with the location and times of the public scoping meetings.

The scoping meetings provided an opportunity for the attendees to learn about the Proposed Action (i.e., issuance of an ITP) and comment on environmental issues of concern and the alternatives that should be discussed in the EIS. Comments received during the scoping process are summarized below. The first meeting was advertised on the Service's website, and an e-mail was sent out to interested parties announcing the second webinar (May 23, 2016).

1.4.1 Issues Raised During Public Scoping Period

During the scoping period, 16 written comments were received. A copy of all written comments received during scoping is on file at the Illinois – Iowa Ecological Services Office. The comments included 12 from members of the public, 2 from NGOs (Bat Conservation International [BCI] and The Nature Conservancy [TNC]), 1 from a county agency (Adair County Board of Supervisors), and 1 from a federal agency (The National Park Service [NPS]). The comments received are summarized by topic below.

<u>Covered Species</u>

- Tri-colored bats should be considered as a covered species.

<u>ITP-related</u>

- Several commenters were against any sort of legalized eagle take;
- Several commenters believed an ITP should not be needed. USFWS should not be involved in wind turbines.

<u>Alternatives</u>

- One commenter requested that turbines not be spaced so close together, suggesting a minimum of 1-mile between turbines;
- Critical habitat should be avoided, as should habitat of high conservation value (defined as areas identified in landscape-scale plans, bird conservation areas, areas identified in Iowa's Wildlife Action Plan);
- One alternative should be inclusion in the Midwest Wind Energy Multi-Species HCP (MSHCP).

<u>Mitigation</u>

- One commenter emphasized the importance of mitigation to the plan.
- TNC requested that mitigation should adhere to the principles outlined in recent policies and be landscape-based.

<u>Adaptive Management</u>

- NPS requested that adaptive management strategies for new information on migratory pathways/migration routes be put in place.

<u>Resource Areas of Concern</u>

- A landowner commented that they have not noticed any noise issues;
- Several landowners commented that they are pro-wind development, do not believe there are any bird or bat issues, or issues are minimal;

- One landowner indicated that the land impact of a wind turbine and associated facilities is very small;
- Analysis should include climate change;
- Analysis should include the entire species' range, extending beyond Iowa;
- Fatality estimates should be adjusted for sources of bias;
- Impacts to covered species should be analyzed separately, conservation measures may be different based on differences between covered species, which should be investigated;
- Indirect effects to bats should be considered, including habitat fragmentation;
- Analyze the timing of bat fatalities, especially with regard to reproductive potential;
- Tree removal should occur outside of the bat active season, and impacts to bat habitat should be analyzed.
- Existing and planned projects be included in the analysis.
- Analysis of noise and visual impacts to NPS units; specifically, Effigy Mounds (Iowa), Herbert Hoover National Historic Site (Iowa), Pipestone National Monument (Minnesota), Mormon Pioneer National Historic Trail (Iowa and Nebraska), Lewis and Clark National Historic Trail (Nebraska) and Missouri National Recreation River (Nebraska);
- Analysis of flyways and foraging areas, including adaptive management for new information on migratory pathways;
- Reduce nighttime lighting, including consideration of Audio Visual Warning Systems (AVWS).

Statements of opposition or support

- Concern that power produced does not stay in the state but goes to Minneapolis or Chicago;
- Wind turbines are not aesthetically pleasing/destroy the landscape;
- Several commenters, including landowners, indicated their pro-wind development support.

Public Involvement

- Several public commenters, one tribe, and the county agency requested copies of the DEIS when available.

1.4.2 Draft EIS Public Review

The Draft EIS (DEIS) was published in the Federal Register for public review on August 31, 2018 (83 FR 44652) in accordance with requirements set forth in the NEPA and its' implementing regulations (40 CFR 1500-1508). Public comments were accepted during a 45-day period following publication of the Federal Register Notice of Availability. One public hearing was held during the comment period, on September 27, 2018, in Ankeny, Iowa. An online public hearing was also held during the comment period, on October 3, 2018. Comments received during the comment period were taken into account and resulted in some modifications in the FEIS. Responses to substantive comments on the DEIS and Draft HCP can be found in Appendix E of this FEIS. A summary of changes made to the DEIS and reflected in this FEIS can be found in Appendix F.

Following issuance of this FEIS, the Service will publish the Record of Decision (ROD) documenting its decision on whether to issue the ITP no earlier than 30 days after the FEIS is published. The Service does not have a formal administrative appeal procedure for NEPA decisions. Judicial review of a Service

NEPA decision can be accomplished in Federal court under the Administrative Procedure Act (5 U.S.C. §500 et seq).

1.4.3 Decisions to be Made by Responsible Officials

The Service must decide whether to issue or deny the proposed ITP. The issuance criteria for an ITP are contained in section 10(a)(2)(B) of the ESA and the implementing regulations for the ESA (50 C.F.R. 17.22(b)(2) and 17.32(b)(2) and 50 C.F.R. 222.307(c)(2)). MEC would serve as the permittee under the ITP and is liable for all obligations assigned to them under the ITP, HCP, and associated documents. An ITP shall be issued to MEC if the Service determines that the ITP meets above referenced statutory and regulatory criteria.

2.0 ALTERNATIVES

The NEPA requires that the environmental documents prepared for a proposed action discuss alternatives. Therefore, this chapter describes the development of alternatives and then alternatives considered in the EIS relevant to the proposed action (i.e., issuance of an ITP by the Service pursuant to the provisions of section 10(a)(1)(B) of the ESA).

Each alternative was evaluated for its ability to meet the purpose and need requirements of the Service, feasibility to implement, and environmental impacts, and only those alternatives that passed the screening process were selected for detailed analysis.

2.1 DEVELOPMENT OF ALTERNATIVES

Alternatives to the proposed action were developed by analyzing elements (Table 2.1-1) that could be a part of an HCP for Indiana bats, northern long-eared bats, little brown bats, tri-colored bats, and bald eagles. More specifically, these elements would change how the permit would be issued, such as the structure of the permit (e.g. duration) or the amount of incidental take authorized for the covered species. Additionally, the Service incorporated elements identified during the public scoping period (see Section 1.4), analyzed a No Action Alternative, and evaluated alternatives developed in detail outside of this document[4] including MEC's HCP (see Section 2.2.1.7) and the Midwest Wind MSHCP (see Section 2.2.2.1).

The elements of action alternatives considered encompassed a range of categories, including:

- Administrative Elements (elements that would change the permit structure)
- Elements Affecting Eagles (elements that would change the number of eagles killed)

[4] Alternatives which are fully described in other documents (i.e., were not developed by the Service for the purposes of the EIS)

- Elements Affecting Bats (elements that would change the number of bats killed)

Once these elements had been identified (see Table 2.1-1 and additional details below in Section 2.1.1.1 through Section 2.1.1.3), each element was screened (see Section 2.1.1 for screening criteria) to determine if the element should be carried forward in the development of alternatives. Elements remaining after the screening process were then combined to create alternatives consisting of an administrative element, an element affecting eagles, and some combination of elements affecting bats (curtailment and a time period for the curtailment). Alternatives were created using a variety of possible combinations of these elements and then screened again. During this step, the No Action Alternative and the alternatives developed in detail outside of this document[5] (MEC's HCP Alternative and Participating in the Midwest Wind MSHCP Alternative) were used to create the final list of alternatives carried forward for detailed analysis (see Section 2.2.1).

[5] Alternatives which are fully described in other documents (i.e., were not developed by the Service for the purposes of the EIS)

Table 2.1-1. Elements identified as potential aspects of alternatives for issuance of an ITP for Indiana bats, northern long-eared bats, little brown bats, tri-colored bats, and bald eagles for MEC's 22 covered projects within the state of Iowa. Each fully-developed alternative will require at least one element from each column in order to address the permit structure (administrative elements), minimize impacts to eagles, and minimize impacts to bats by curtailing during certain time periods.

Administrative Elements	Elements Affecting Eagles	Elements Affecting Bats	
		Curtailment	Time Period
Single HCP covering 22 covered projects	Removing Carrion	No operational adjustment (no feathering)	Entire covered species' active season[1] (March 15 –November 15)
Programmatic HCP (HCP covering 22 covered projects and any new build-out)	On-site biological monitors	Manufacturer's cut-in[2]	Peak bat fatality period (July 15 – October 15)[3]
Separate HCP and ECP	Seasonal operational restrictions	5.0 m/s	Peak bat fatality period (July 15 – October 15) plus turbines within 1,000 ft of suitable habitat during the entire covered species' active season (April 1 – November 15)
Reduced permit term	Technologies to reduce fatalities and/or interactions with turbines	6.0 m/s	
22 separate HCPs, covering each project individually		6.9 m/s	
		Turbines shut-down at night	

[1] For the purposes of this EIS, the "active season" is referring to only the covered species, not tree-bats, which can be active outside of this time period.
[2] See Table 1.2-1 for the manufacturer's cut-in speed for each facility.
[3] MEC-specific data have shown that all-bat fatalities peak from July 15 – September 30 at their covered projects. The Service chose to add 2 weeks (October 1 – October 15) to this time period to best capture the remaining period of risk for covered species.

2.1.1 Screening of Alternative Elements

The first level of screening was to eliminate elements that:

1. Did not respond to MEC's application for an ITP covering take of Indiana bats, northern long-eared bats, little brown bats, tri-colored bats, and bald eagles at their 22 covered projects.

2. Did not protect, conserve, and enhance the Indiana bat, northern long-eared bat, little brown bat, tri-colored bat, and bald eagle.

3. Did not conserve the ecosystems which support the Indiana bat, northern long-eared bat, little brown bat, tri-colored bat, and bald eagle.

4. Placed an increased administrative burden on the Service (e.g., individual permits for individual projects).

5. Are not reasonable to implement (i.e., another less restrictive alternative would result in the same environmental impacts).

The second level of screening was to determine whether the best available science supports a significant conservation benefit between alternative elements.

2.1.1.1 Administrative Elements

Administrative elements are those elements which would influence the way the permit would be structured, including how the HCP and NEPA analysis was set-up. Elements identified, and the results of the screening analysis, are summarized below:

- Single HCP covering 22 covered projects: this HCP would include avoidance, minimization, and mitigation measures for the 22 covered projects, and a single ITP would be issued.

    - This element was **retained** for alternative development because it responds to MEC's request for an ITP and minimizes the administrative burden.

- Programmatic HCP: this HCP would outline the program (i.e., conservation measures) for all 22 covered projects and future MEC wind build-out, and each project or group of projects would apply for an ITP under this program using a tiered HCP and tiered NEPA.

    - This element was **eliminated** from consideration because it would create an increased administrative burden on the Service and because conservation measures identified for the 22 covered projects may not also be appropriate for new projects.

- Separate HCP and ECP: this HCP would cover only the bats, and a separate ECP would be developed for eagles, resulting in two separate permits, one for the bats and a separate, 30-year permit for the eagles based on the current regulations for eagle take permits.

    - This element was **eliminated** from consideration because it would create an increased administrative burden on the Service and because it provides no significant conservation benefit to the covered species over other alternatives. Specifically, this element would cause the Service to process two separate application documents and prepare two separate NEPA documents. Also, mitigation to offset the impact of the taking of eagles under an ECP would be equal to, or less than proposed under the HCP.

- Reduced Permit Term: under this element, the total term of the ITP would be reduced from 30 years to a period between 1 and 29 years.

    - This element was **eliminated** from consideration because the applicant has requested a permit for the complete operational life of the project. This element does not meet that need. Additionally, the conservation benefits of a longer permit term length are considered by the Service to be greater than a shorter permit term length. Specifically, the conservation benefits include a larger amount of mitigation implemented earlier, a greater amount of time in which the impacts of the projects will be monitored and minimized, and more certainty regarding the outcome of the mitigation (due to more long-term monitoring). The impacts from any given shorter-term permit can be easily inferred from the impacts from the 30-year permit alternatives described in detail. Therefore, this element does not warrant an in-depth exploration.

- 22 separate HCPs, covering each project individually: this element would include 22 HCPs, 22 separate NEPA compliance documents, and 22 separate ITPs covering each MEC project individually.

    - This element was **eliminated** from further consideration because it is less accurate to estimate impacts of individual projects on the covered species compared to an assessment of the projects as a whole with any currently available fatality estimation methods. This element would also create a greatly increased administrative burden on the Service and Applicant.

Based on this screening, alternatives were developed related to the operations of the 22 covered projects and do not address the construction or operation of the Wind XI projects.

2.1.1.2 Elements Affecting Eagles

Elements affecting eagles are those elements that would influence the number of eagles killed. Elements identified, and the results of the screening analysis, are summarized below:

- Carrion removal: this would involve regularly removing carrion from the project area to decrease food sources and subsequently decrease eagle use of the area, thereby decreasing risk.

    - This element was **retained** for alternative development because it is expected to have a conservation benefit to eagles.

- On-site biological monitors: this would involve employing biologists to monitor for eagle activity year-round or during periods of high risk, allowing the wind farm to shut-down operations if an eagle was spotted within a certain distance of turbines, thereby avoiding take of eagles.

  - This element was **eliminated** from consideration because it would not be a reasonable measure for MEC to implement due to the cost to implement compared to the uncertain and potentially unmeasurable conservation benefit[6] (USFWS 2013).

- Seasonal restrictions: this would involve shutting down turbine operations during daylight hours (when eagles are active) during periods of highest risk (months or seasons when eagles are present at the site, based upon pre- and post-construction monitoring results).

  - This element was **eliminated** from consideration because the conservation benefits of turbine shut-downs on bald eagles in the Midwest are currently unknown. It would not be a reasonable measure for MEC to implement due to the loss of power production when compared to the uncertain and potentially unmeasurable conservation benefit[7] (USFWS 2013).

- Technologies to reduce fatalities and/or interactions with turbines: this would involve the use of new technologies (e.g., IdentiFlight, ultraviolet light deterrents) to reduce eagle interactions with turbines and/or turbine-related fatalities.

  - This element was **eliminated** from consideration because the technologies are not readily available for deployment at a multi-site scale, and scientific studies on their effectiveness are currently on-going. Due to the lack of data, it is not possible at this time to meaningfully evaluate or estimate the reduction in eagle mortality that would result from the use of new technologies.

- Alternative siting of turbines: this would involve the deconstruction and/or decommissioning of individual turbines and/or the movement of turbines to reduce impacts to eagles.

  - This element was added in response to public comment received during the notice period on the DEIS and HCP. The Service did not consult with MidAmerican on turbine siting as part of the permit application and HCP development process because the construction of the turbines was not a covered activity under the HCP and was also not expected to cause take of bald eagles. Based on the eagle use and fatality data collected over the last several years at the covered projects, there is insufficient information to indicate that one turbine, group of turbines, or facility under the proposed activity has a level of difference in risk that can be quantified if turbines were moved or removed. Therefore, this element is **eliminated** because it is not reasonable to implement and the best available science

[6] USFWS (2013) outlined this as an experimental Advanced Conservation Practice (ACP). ACPs are defined as "scientifically supportable measures that are approved by the Service and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable: (50 CFR 22.3). These are "experimental" because they do not currently meet this standard (i.e., they do not currently have scientific data to support the conservation benefit).
[7] USFWS (2013) outlined this as an experimental Advanced Conservation Practice (ACP). ACPs are defined as "scientifically supportable measures that are approved by the Service and represent the best available techniques to reduce eagle disturbance and ongoing mortalities to a level where remaining take is unavoidable: (50 CFR 22.3). These are "experimental" because they do not currently meet this standard (i.e., they do not currently have scientific data to support the conservation benefit).

does not indicate that a greater conservation benefit would be achieved through alternative siting of turbines than that achieved by other alternatives explored.

2.1.1.3 Elements Affecting Bats

Elements affecting bats are those elements which would influence the number of bats killed. The elements affecting bats included two categories: cut-in speeds and time periods for curtailment. A summary of each category, the elements identified in each category, and the results of the screening analysis are summarized in the sections below.

2.1.1.3.1 Operational Adjustments

Elements related to operational adjustments would dictate when turbines are feathered (i.e., to reduce the blade angle to the wind to slow or stop the turbine from spinning). Below the cut-in speed, turbine blades would be feathered so that they do not spin until a designated cut-in speed is reached. Cut-in speeds are the wind speed at which rotors begin rotating and producing power. All curtailment studies to-date show a generally consistent inverse relationship between cut-in speeds and bat mortality (Table 2.1-2). Curtailment actions effective at reducing risk of collision for all bat species (including tree bats) are assumed to be equally effective for Indiana bats, northern long-eared bats, little brown bats, and tri-colored bats.

Table 2.1-2. Summary of publicly available curtailment studies on bats conducted to-date in eastern North America[1].

Project	Year	State/Province[2]	Cut-in Speed	Reduction	Average Reduction	Citation
Fowler Ridge	2011	Indiana	3.5	36%	36%	Good et al. 2012
Laurel Mountain	2011	West Virginia		35%		Stantec 2015
Summerview	2007	Alberta	4	57%	39%	Baerwald et al. 2009
Mount Storm	2010	West Virginia		22-47%		Young et al. 2011[3]
Mount Storm	2011	West Virginia		12%		Young et al, 2012
Fowler Ridge	2011	Indiana	4.5	57%	59%	Good et al. 2012
Wolfe Island	2011	Ontario		48%		Stantec 2012
Anonymous 1	2010	USFWS Region 3		47%		Arnett et al. 2013[4]
Laurel Mountain	2011	West Virginia		73%		Stantec 2015

Project	Year	State/Province[2]	Cut-in Speed	Reduction	Average Reduction	Citation
Laurel Mountain	2012	West Virginia		71%		Stantec 2015
Casselman	2008	Pennsylvania	5	87%	62%	Arnett et al. 2011
Casselman	2009	Pennsylvania		68%		Arnett et al. 2011
Fowler Ridge	2010	Indiana		50%		Good et al. 2011[5]
Pinnacle	2012	West Virginia		47%		Hein et al. 2013[4]
Pinnacle	2013	West Virginia		58%		Hein et al. 2014
Criterion	2012	Maryland		62%		Young et al. 2013
Summerview	2007	Alberta	5.5	60%	66%	Baerwald et al. 2009
Fowler Ridge	2011	Indiana		73%		Good et al. 2012
Wolfe Island	2011	Ontario		60%		Stantec 2012
Anonymous 1	2010	USFWS Region 3		72%		Arnett et al. 2013[4]
Sheffield	2012	Vermont	6	63%	63%	Martin et al. 2013
Casselman	2008	Pennsylvania	6.5	74%	76%	Arnett et al. 2011
Casselman	2009	Pennsylvania		76%		Arnett et al. 2011
Fowler Ridge	2010	Indiana		78%		Good et al. 2011[5]
Pinnacle	2013	West Virginia		75%		Hein et al. 2014
Beech Ridge	2012	West Virginia	6.9	73-89%	81%	Tidhar et al. 2013[6]

[1] Studies conducted in USFWS Region 8 (California and Nevada) were excluded due to the high proportion of Brazilian free-tailed bats (*Tadarida brasiliensis*), a species known to be active in higher wind speeds compared to the typical suite of species in Iowa. Due to this, the reductions in bat fatalities are likely lower than what would be seen in Iowa.
[2] USFWS Region 3 includes Minnesota, Iowa, Missouri, Illinois, Wisconsin, Indiana, Michigan, and Ohio.
[3] This study looked at curtailment for the first half of the night (47% reduction) versus the second half of the night (22% reduction). It was assumed for this analysis that curtailing for the full night would result in at least a 47% reduction.
[4] These studies used modelled differences, not calculated reductions based on fatality estimates.
[5] These studies did not feathering below cut-in speed.
[6] This study did not have control turbines, so this is the reduction from the West Virginia average (73%) and from the average in the Northeastern United States (83%).

Elements identified, and the results of the screening analysis, are summarized below:

- No Operational Adjustment: no increase in cut-in speed or feathering of turbine blades.

    - This element was **eliminated** from consideration because it does not protect, conserve, or enhance the covered bat species. While this element was eliminated, it is included in Chapter 4 (Environmental Consequences) as a baseline comparison for the other alternatives because baseline fatality data for calculating impacts were collected under turbines that were not feathered.

- Manufacturer's (3.0-4.0 m/s)[8]: turbine blades would be feathered below the manufacturer's cut-in speed at each turbine, which has been shown to reduce fatalities by a minimum of 35% (Baerwald et al. 2009; Good et al. 2012; Young et al. 2011).

    - This element was **retained** for future analysis because the best available scientific data has documented a positive impact on all bat fatality rates, and presumably on the listed species as well.

- 5.0 m/s cut-in speed: turbines would be feathered below 5.0 m/s at all turbines across all covered projects. Publicly-available curtailment studies (see Table 2.1-2) have found that increasing turbine cut-in speed to 5.0 m/s can result in reductions in average nightly bat fatality ranging from 47% to 87%.

    - This element was **retained** for future analysis because the best available scientific data has documented a positive impact on all bat fatality rates, and presumably on the listed species as well.

- 5.5 m/s cut-in speed: turbines would be feathered below 5.5 m/s at all turbines across all 22 covered projects. Research has shown that this can reduce fatalities by 60 to 73% (see Table 2.1-2), which is not outside the range of reductions seen at 5.0 m/s (see Table 2.1-2). Additional research into cut-in speed adjustments at the Bishop Hill Wind Farm in Illinois did not show a significant difference between 5.5 m/s and 6.9 m/s (Good et al. 2013, 2014).

    - This element was **eliminated** from consideration because the best available science does not support a significant conservation benefit when compared to a 5.0 m/s cut-in speed. Specifically, the percent reduction in bat fatality estimates noted by these studies falls within the range of reductions found at 5.0m/s.

- 6.0 m/s cut-in speed: turbines would be feathered below 6.0 m/s at all turbines across all 22 covered projects. Research has shown that this can reduce fatalities by 38 to 63% (Arnett at al. 2013; Martin et al. 2013), which is not outside the range of reductions seen at 5.0 m/s (see Table

[8] See Table 1.3-1 for the manufacturer's cut-in speed by facility. The single State Fair Turbine has a manufacturer's cut-in speed outside of this range (4.9 m/s).

2.1-2). Additional research into cut-in speed adjustments at the Bishop Hill Wind Farm in Illinois did not show a significant difference between 5.5 m/s and 6.9 m/s (Good et al. 2013, 2014).

- This element was **retained** for future analysis because of public comments received during the public comment period. Specifically, the Service received public comments requesting that the Service consider alternatives with a greater reduction in bat fatalities.

- 6.5 m/s cut-in speed: turbines would be feathered below 6.5 m/s at all turbines across all 22 covered projects. Research has shown that this can reduce fatalities by 74 to 78% (see Table 2.1-2), which is not outside the range of reductions seen at 5.0 m/s or 6.9 m/s (see Table 2.1-2).

    - This element was **eliminated** from consideration because the best available science does not support a significant conservation benefit when compared to a 5.0 or 6.9 m/s cut-in speed, which are elements of other alternatives carried forward for detailed analysis. Specifically, the percent reduction in bat fatality estimates noted by these studies falls within the range of reductions found at 5.0m/s.

- 6.9 m/s cut-in speed: turbines would be feathered below 6.9 m/s at all turbines across all 22 covered projects. The Service has determined that raising the cut-in speed to 6.9 m/s constitutes avoidance of mortality for Indiana bats and northern long-eared bats (USFWS 2014). It is anticipated that all bat fatality would decrease by a minimum of 73% under this operational regimen based on studies conducted in West Virginia (Tidhar et al. 2013). Additionally, Taucher et al. 2012 compiled acoustic activity data from wind farms across the state of Pennsylvania and found that 76% of all bat activity occurred when wind speeds were below 6.9 m/s. The actual reduction may even be greater given the location of MEC's wind turbines away from forested areas, where wind speed may have a greater impact on bat activity.

    - This element was **eliminated** from consideration because it would not be reasonable to implement. This is because Indiana bats are the only bat species where take is currently prohibited (little brown bats and tri-colored bats are not currently listed, and northern long-eared bat take is exempt under the 4(d) rule, see Section 3.4.2.2.2), so in the absence of an ITP, it would not be necessary for MEC to operate all wind energy facilities at the level of avoidance, but rather it would be limited to facilities within the range of the Indiana bat. Furthermore, implementing 6.9 m/s at only the turbines within the Indiana bat range is already considered under the no action alternative.

- Turbines shut-down at night: all turbine operations would cease at night at all 22 covered projects.

    - This element was **eliminated** from consideration because this protocol would not be reasonably implemented because Indiana bats are the only bat species where take is currently prohibited (little brown bats and tri-colored bats are not currently listed, and the northern long-eared bat take is exempt under the 4(d) rule, see Section 3.4.2.2.2), so in the absence of an ITP, it would not be necessary for MEC to shut down all wind energy

facilities to the level of avoidance, but rather it would be limited to facilities within the range of the Indiana bat. In addition, the Service determined that it would not provide any additional conservation benefit to the covered species above curtailing at 6.9 m/s, because feathering below 6.9 m/s is already considered an avoidance measure.

- Alternative siting of turbines: this would involve the deconstruction and/or decommissioning of individual turbines and/or the movement of turbines to reduce impacts to bats.

    - This element was added in response to public comment received during the notice period on the DEIS and HCP. The Service did not consult with MidAmerican on turbine siting as part of the permit application and HCP development process because the construction of the turbines was not a covered activity under the HCP and was not expected to cause take of listed species. Furthermore, based on bat fatality data collected over the last several years at the covered projects (as found in the addendum to the HCP), there is no indication that one single turbine, group of turbines, or facility has a level of risk that cannot be reduced through cut-in speed adjustments, which are explored in the alternatives carried forward for detailed analysis. For example, relocation of turbines to outside of the Indiana bat range (take of northern long-eared bats from wind turbines is not currently prohibited), does not produce a difference in estimated take than the no action alternative (which includes avoidance of Indiana bat take through operational adjustments) carried forward for detailed analysis. We also do not believe that it would be practical or feasible from a technical or economic standpoint to tear down and relocate turbines for reduction in impacts that is uncertain and cannot be distinguished from operational adjustments. Therefore, this element is **eliminated** because it is not reasonable to implement and the best available science does not indicate that a greater conservation benefit would be achieved through alternative siting of turbines than that achieved by other alternatives explored.

2.1.1.3.2 Time Period for Operational Adjustments

These elements involve the time of year that curtailment would be implemented. It was assumed for this analysis that all curtailment would take place from sunset to sunrise, when bats are most active[9], as also proposed in the HCP.

- Peak Bat Fatality Period: Under this regimen, curtailment would be implemented during the peak bat fatality period (July 15 to October 15, see table 2.1-1) at a site.

    - This element was **retained** for future analysis because the best available scientific data has recognized that targeting the period with the highest bat fatalities will result in the highest decrease of overall bat fatalities and the highest overall decrease of fatalities for covered species (see Section 3.3.2.1.2).

[9] Blanchong (2017) found that 0.19% of bat activity occurs before sunset, and less than 0.01% occurs after sunrise.

- Peak Bat Fatality Period, plus turbines within 1,000 ft during active season: Under this regime, curtailment would be implemented during the peak bat fatality period (July 15 – October 15) at a site, as well as at turbines located within 1,000 ft of suitable summer bat habitat during the entire bat active season. Because acoustic absence results may only be valid for 2 years (USFWS 2017a), this would be implemented at all sites, not just those with documented summer presence of either Indiana bats or northern long-eared bats (see Sections 3.4.2.2.1 and 3.4.2.2.2), due to the 30-year length of the permit term.

    - This element was **retained** for future analysis because it has been shown using the best available scientific data to target the time period with the highest overall bat fatality rates and the highest overall fatality rates of the covered species. (see Section 3.3.2.1.2). In addition, activity of Indiana bats and northern long-eared bats is typically limited to within 1,000 ft of suitable habitat during the summer maternity season (USFWS 2014), and curtailing turbines within 1,000 ft during that time period would further reduce risk for those two covered species.

- Entire Active Season: curtailment would be implemented during the entire bat active season (March 15 to November 15) at a site.

    - This element was **retained** for future analysis because it would minimize bat fatality during the entire season of risk based on the best available scientific data.

2.2 ALTERNATIVES

A single administrative element and a single element affecting eagles were carried forward for all action alternatives (see Sections 2.1.1.1 and 2.1.1.2 above). For the elements affecting bats (see Section 2.1.1.3), three cut-in speeds (manufacturer's cut-in, 5.0 m/s, and 6.0 m/s) and three time periods (entire active season, peak bat fatality period, and peak bat fatality period plus turbines within 1,000 ft. of suitable habitat) were retained.

Because the "No Operational Adjustment" element had been eliminated from further analysis, all action alternatives include, at a minimum, feathering below manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season. This results in the following action alternatives:

- Alternative A - 5.0 m/s cut in speed for the entire bat active season
- Alternative B - 5.0 m/s cut-in speed during the peak bat fatality period and at turbines within 1,000 ft. of suitable habitat for Indiana and northern long-eared bats during the entire bat active season
- Alternative C - 5.0 m/s cut-in speed during the peak bat fatality period
- Alternative D - manufacturer's cut-in speed for the entire bat active season
- Alternative E – 6.0 m/s cut in speed for the entire bat active season
- MEC's HCP Alternative
- Participate in the Midwest Wind MSHCP Alternative

These action alternatives, along with a No Action Alternative, and the assessment of why they were carried forward or eliminated from detailed analysis, are described in detail below in Section 2.2.1 (Alternatives Carried Forward for Detailed Analysis) and Section 2.2.2 (Alternatives Considered and Eliminated).

2.2.1 Alternatives Carried Forward for Detailed Analysis

2.2.1.1 Elements and Components Common to All Action Alternatives

Based on the screening of elements described in Section 2.1.1, several components are common to all action alternatives and are described in detail below.

2.2.1.1.1 Administrative

Based on the screening of the administrative elements (see Section 2.1.1.1), all alternatives include a single HCP covering the 22 projects described in Section 1.2.1.

2.2.1.1.2 Bald Eagle Minimization

The only currently feasible minimization measure to reduce bald eagle use, and thus bald eagle fatalities, at the scale of the covered projects is to implement carrion removal programs and landowner education to reduce attractants within and near an operating wind farm. These minimization protocols will be included for any action alternative.

2.2.1.1.3 Bald Eagle Mitigation

Take of bald eagles would be expected to be the same under all action alternatives, as all alternatives contain the same minimization measures; therefore, the mitigation for each action alternative would be the same as that proposed in MEC's HCP ($5,340/eagle for 300 eagles, or a total of $1,602,000 deposited into an eagle conservation fund; see MEC's HCP Section 5.3.3.3).

2.2.1.1.4 Covered Bats Minimization

Because the "No Operational Adjustment" element was eliminated from further alternatives analysis (see Section 2.1.1.3.1), all action alternatives include, at a minimum, the minimization measure of feathering below the manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 – November 15). Individual alternatives may include increased cut-in speeds during all or part of the bat active season, but no alternative includes operation of any turbines without feathering below manufacturer's cut-in speed when bats are active.

2.2.1.1.5 Covered Bats Mitigation

All alternatives that include issuance of an ITP would include mitigation to offset the impact of taking of the covered species. The USFWS Resource Equivalency Analysis (REA) models would be used to

determine the appropriate amount of mitigation to fully offset the impacts of taking for the covered bat species. We assume the same implementation and authorized take rate structure identified in the HCP would be implemented in the alternatives, and analyzed the authorized take rate and associated mitigation as the maximum impact. Furthermore, projects proposed for mitigation would undergo Technical Review Team evaluation and Service approval prior to implementation, as described in Section 5.3 of the MEC HCP. The Service would ensure that due diligence on all applicable laws and ordinances (e.g. National Historic Preservation Act [NHPA], Clean Water Act) would be conducted prior to project approval. Due diligence would include surveys and the implementation of appropriate avoidance measures or separate permitting for protected resources.

2.2.1.1.6 Post-Construction Monitoring

Post-construction monitoring is a required component for any alternative that results in issuance of an ITP, to ensure compliance with the permit terms. Monitoring will occur annually and will involve a minimum of once monthly monitoring for bald eagle fatalities (utilizing 328 ft. [100-m] visual scans at each turbine for the entire year), as well as weekly road-and-pad searches at all turbines for bat fatalities during the peak bat fatality period (July 15 to October 15). Searcher efficiency and carcass removal trials will be conducted to provide bias correction factors. The post-construction monitoring plan is described in detail in Section 5.4 of the MEC HCP.

The Informed Evidence of Absence take calculation method developed by Western Ecosystems Technology, Inc. (WEST; refer to HCP Appendix D for more details) will be used to calculate take of covered species and for the adaptive management triggers (described below in Section 2.2.1.1.7).

2.2.1.1.7 Adaptive Management

All alternatives resulting in issuance of an ITP will include adaptive management, with three levels of triggers:

1. Level I – if the projected take is less than or equal to the implementation take, then no changes will occur, and MEC will continue implementing the HCP.

2. Level II – if projected take is greater than the implementation take, but less than or equal to the authorized take, then MEC will plan to implement additional mitigation in years 15 and/or 25.

3. Level III – if the projected take is greater than the authorized take, then MEC will either:

    a. Reduce take to below the authorized take by targeted curtailment and/or deployment of deterrents; or

    b. Implement additional mitigation if an adaptive management response has also been triggered at an earlier meeting; or

c. Amend the permit if the cumulative take and projected take would exceed the authorized take.

2.2.1.2 No Action Alternative

Under the No Action Alternative, an ITP would not be issued, and no HCP would be prepared. MEC would avoid take of Indiana bats by raising the cut-in speed to 6.9 m/s at facilities within the Indiana bat range (see Section 3.4.2.2.1) and would obtain a separate eagle take permit for any facility with an expected take of bald eagles. No post-construction monitoring or mitigation for bats would occur, as take would be avoided for Indiana bats. Take of northern long-eared bats resulting from operation of wind turbines is currently exempt under the 4(d) rule, and little brown bats and tri-colored bats are not currently protected under the ESA. Should the little brown bat or tri-colored bat become listed, the northern long-eared bat 4(d) rule be revised or removed, or the northern long-eared bat's listing be changed to endangered, it is anticipated that MEC would implement measures to avoid take of these species as well.

2.2.1.3 Alternative A

Under Alternative A, all turbines would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed. This operational protocol is estimated to reduce all bat fatalities, including those of the covered species, by 62% (using the average reductions; Table 2.1-2). An HCP would be developed (see Section 2.2.1.1.1), and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2), and take of bald eagles would be mitigated (see Section 2.2.1.1.3). Post-construction monitoring would be conducted (see Section 2.2.1.1.6), and an adaptive management framework would be implemented according to the HCP to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7). Take of the covered bat species would be mitigated with up to 1,852 acres of habitat protection/restoration and up to 27 artificial roost structures (Section 2.2.1.1.5).

2.2.1.4 Alternative B

Under Alternative B, all turbines would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed. In addition, all turbines within 1,000 ft. of suitable Indiana or northern long-eared bat habitat would operate with a cut-in speed of 5.0 m/s for the entire the bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.2-1) outside of the peak bat fatality period with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These actions would be expected to reduce all bat fatalities, including those of the covered species, by 62% when operating at 5.0 m/s and by 36-39% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

An HCP would be developed (see Section 2.2.1.1.1), and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2), and take of bald eagles would be mitigated (see

Section 2.2.1.1.3). Post-construction monitoring would be conducted (see Section 2.2.1.1.6), and an adaptive management framework would be implemented according to the HCP to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7). Take of the covered bat species would be mitigated with up to 1,852 acres of habitat protection/restoration and up to 30 artificial roost structures (Section 2.2.1.1.5).

2.2.1.5 Alternative C

Under Alternative C, the cut-in speed of all turbines would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed. In addition, all turbines would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities, including those of the covered species, by 62% during the fall migratory period when operating at 5.0 m/s and by 36-39% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

An HCP would be developed (see Section 2.2.1.1.1), and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2), and take of bald eagles would be mitigated (see Section 2.2.1.1.3). Post-construction monitoring would be conducted (see Section 2.2.1.1.6), and an adaptive management framework would be implemented according to the HCP to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7). Take of the covered bat species would be mitigated with up to 2,075 acres of habitat protection/restoration and up to 30 artificial roost structures (Section 2.2.1.1.5).

2.2.1.6 Alternative D

Under Alternative D, all turbines would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 through November 15). No facilities or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities, including those of the covered species, by 36-39% (Table 2.1-2).

An HCP would be developed (see Section 2.2.1.1.1), and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2), and take of bald eagles would be mitigated (see Section 2.2.1.1.3). Post-construction monitoring would be conducted (see Section 2.2.1.1.6), and an adaptive management framework would be implemented according to the HCP to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7). Take of the covered bat species would be mitigated with up to 3,200 acres of habitat protection/restoration and up to 50 artificial roost structures (Section 2.2.1.1.5).

2.2.1.7 Alternative E

Under Alternative E, all turbines would operate with a cut-in speed of 6.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed. This operational protocol is estimated to reduce all bat fatalities, including those of the covered species, by 63% (using the average reductions; Table 2.1-2). An HCP would be developed (see Section 2.2.1.1.1), and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2), and take of bald eagles would be mitigated (see Section 2.2.1.1.3). Post-construction monitoring would be conducted (see Section 2.2.1.1.6), and an adaptive management framework would be implemented according to the HCP to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7). Take of the covered bat species would be mitigated with up to 1,852 acres of habitat protection/restoration and up to 28 artificial roost structures (Section 2.2.1.1.5).

2.2.1.8 MEC's HCP Alternative

Under MEC's HCP Alternative, all turbines would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30 at four facilities: Macksburg, Lundgren, Charles City, and Wellsburg, when temperatures are above 50º Fahrenheit (F). These four facilities have been identified as having the highest level of risk to the covered bat species (see Chapter 3 for more details on post-construction monitoring results to-date).

The projects would operate under MEC's HCP, and an ITP would be issued for Indiana bats, northern long-eared bats, tri-colored bats, little brown bats, and bald eagles. Bald eagle minimization would include carrion removal (see Section 2.2.1.1.2 and MEC's HCP Section 5.7.1), and take of bald eagles would be mitigated (see Section 2.2.1.1.3 and MEC's HCP Section 5.7.3.2). Post-construction monitoring would be conducted (see Section 2.2.1.1.6 and MEC's HCP Section 5.4), and the adaptive management framework in MEC's HCP would be implemented to ensure that take remains in compliance with the ITP (see Section 2.2.1.1.7 and MEC's HCP Section 5.5). Take of the covered bat species would be mitigated with up to 3,200 acres of summer bat habitat protection and/or restoration (see Section 2.2.1.1.5 and MEC's HCP Section 5.7.3.1).

2.2.2 Alternatives Considered and Eliminated

Development and screening of action alternatives is described above in Section 2.1. One final action alternative, the Participation in the Midwest Wind Energy MSHCP, was considered but then eliminated for the reasons described below in Section 2.2.2.1.

2.2.2.1 Participation in the Midwest Wind Energy MSHCP

Under this alternative, MEC would apply for an ITP under the Midwest Wind Energy MSHCP[10], which would provide coverage for the least tern (*Sterna antillarum athalassos*), piping plover (*Characrius melodus*), Indiana bat, northern long-eared bat, little brown bat, and bald eagle. This alternative would not provide coverage for the tri-colored bat, as the tri-colored bat was not included as a covered species in the Midwest Wind Energy MSHCP. This alternative was eliminated from further consideration because MEC has requested coverage for the tri-colored bat and has not requested coverage for the least tern or the piping plover. In addition, the Midwest Wind Energy MSHCP has not yet been finalized, and therefore it is not currently an available option for take coverage for MEC.

3.0 AFFECTED ENVIRONMENT

3.1 OVERVIEW OF THE AFFECTED ENVIRONMENT

This chapter describes the existing conditions of affected resources within the state of Iowa, as well as within the 22 covered projects. As discussed in Chapter 1, the federal action of issuing an incidental take permit and the associated implementation of the HCP influences only operation of the 22 covered projects and the mitigation for covered species, which are the covered activities. As described in Chapter 2, the alternatives are structured around turbine operational strategies that change the amount of covered species take and associated mitigation that would be authorized in an incidental take permit. The federal action also includes compliance monitoring. More specifically, the turbine operational strategies in the alternatives involve changing cut-in speeds at night, for various seasons throughout the year. Mitigation under all alternatives would consist of eagle habitat protection and enhancement, toxic substance abatement, eagle rehabilitation, preservation of bat artificial roost structures, preservation of forested bat habitat, and/or restoration of forested bat habitat in various amounts according to the amount of covered species take expected. Compliance monitoring would include searches of turbine roads and pads, according to the protocol described in MEC's HCP, Section 5.4 and would be the same under each alternative.

In this chapter, we describe the environmental resources that may be affected by the covered activities influenced by the federal action. In evaluating environmental resources for this analysis, we have determined that covered activities do not affect some resource categories at all, affect some resource categories only minorly, and affect others measurably and warrant an analysis for significant effects. For efficiency sake, and to meet requirements set forth by SO 3355, we have chosen to fully analyze resource categories that are the most affected by the covered activities and may have the potential to be significant. These resource categories are: listed and non-listed bats, birds, and air quality/climate. Resource

[10]Available online: https://www.fws.gov/Midwest/endangered/permits/hcp/r3wind/DraftHCPandEIS.html

categories that are not affected, or affected only minorly are summarized below, and we provide our rationale for not carrying them forward for detailed analysis.

3.2 RESOURCES CONSIDERED, BUT DISMISSED FROM DETAILED ANALYSIS

3.2.1 Geology and Soils

Changes to project operations occur at hub height, compliance monitoring only involves surface foot and vehicle traffic on existing roads and turbine base pads, and mitigation will, at most, only involve digging of shallow holes for tree planting. No major earthmoving activities will be a part of the federal action regardless of alternative, and soil types will not be changed from existing conditions. Therefore, none of these activities are expected to affect soils and geologic resources under any of the alternatives.

3.2.2 Non-Listed, Invasive, Rare, Threatened, or Endangered Plant Species

Project operations only involve alterations of spinning blades, and monitoring will be done on pre-existing roads and turbine pads. Therefore, neither of these actions will affect plants. Mitigation activities occurring in agricultural fields would not affect any plant species because these areas are already disturbed, and presence of these species are unlikely. Forested habitat preservation and enhancement activities may involve invasive species removal, snag creation, and silvicultural practices as identified in Section 5.3.3.1 of the HCP. Rare, threatened, or endangered plant species are not expected to be present in most forested mitigation areas. Federally-listed plant species in Iowa are prairie species, and would not be found in forested habitat or agricultural areas. The mitigation review team will assess the mitigation areas for the presence of listed plants. If they are present, measures will be taken to avoid negative impacts. If negative impacts cannot be avoided, consultation with the IADNR would be conducted..

Mitigation will consist of preservation, enhancement, and/or restoration of forested habitat. Actions will include invasive species removal and planting of native plants, so the potential for introduction and persistence of invasive plant species into mitigation lands is very low because that contradicts the very intent of mitigation.

3.2.3 Cultural, Historic, Noise, and Visual Resources

No effects to cultural or historic resources would occur as a result of project operations because all projects are already constructed and operating and a part of the existing landscape. No impacts to cultural or historic resources would occur as a result of implementation of mitigation because no earth moving, demolition, or construction of new structures would occur as part of mitigation.

Changes to project operations will occur only at night when it is difficult to see rotating or non-rotating blades, and projects are already constructed and operating. Monitoring does not involve any alteration of the landscape. Mitigation actions would include the preservation and enhancement of areas that are already forested and/or the conversion of agricultural fields to forested habitat. The fortification and/or preservation of artificial roost structures, such as old barns, would comply with NHPA. Neither of these

actions changes the basic visual structure of the Iowa landscape, which is predominantly agriculture interspersed with farmsteads and natural areas (National Land Cover Database [NLCD] 2011; Wilken et al. 2011). Therefore, no effect to cultural, historic, or visual resources is expected under any of the alternatives. There may be some changes to the amount of noise produced by the turbines. Specifically, turbines will be feathered more often under any of the alternatives than existing (freewheeling) conditions. No information is available that would allow the Service to analyze the difference in noise levels between freewheeling and the feathering protocols described in the alternatives.

3.2.4 Socioeconomics and Environmental Justice

Minority and low-income populations are communities where the presence of minorities or low-income people is greater than 50% or meaningfully greater than in a geographic area of comparison (Council on Environmental Quality [CEQ] 1997a). No counties in Iowa have a minority population of greater than 50% or poverty levels of greater than 50%. None of the covered activities under any of the alternatives are expected to affect community services because the actions do not affect human infrastructure, such as wastewater treatment systems. Property taxes for parcels containing wind turbines are independent of energy generation, as are easement payments at all projects that will have cut-in speeds elevated above manufacturer's cut-in speed. Therefore, changes to operations are not expected to affect local economies. Given the dispersion of impacts to listed species across the landscape and the expectation that mitigation will result in beneficial environmental impacts, a disproportionate share of adverse environmental effects is not anticipated to be placed on any minority or low-income community.

3.2.5 Human Health and Safety

Safety regulations regarding best management practices (BMPs) for turbine operations are upheld at the county level and are assumed to be in place regardless of the turbine operational regime. Workers conducting monitoring and mitigation activities do this type of work regularly. Therefore, the issuance of the permit does not alter the level or type of exposure of these workers to health and safety hazards. Also, it is assumed that all federal, state, and local ordinances related to health and safety would be followed, as nothing in the HCP or alternatives developed suggests otherwise.

3.2.6 Transportation

Within the boundaries of MEC's covered projects (based on publicly available GIS data) are a total of approximately 1,645 miles of public roads. Each turbine is visited approximately once per month for regularly scheduled maintenance (see Section 5.4 of the HCP). During the proposed period of intensive monitoring (July 15 – October 15) turbines will be visited once per week, and this monitoring regime is the same across all alternatives. Therefore, traffic on roads leading to turbines will be increased by approximately three one-car trips per month. We believe that this does not constitute a significant change in traffic patterns or density within the covered projects. Mitigation activities may result in some temporary local traffic increases associated with restoration activities, but these impacts are expected to be minor and temporary.

3.2.7 State-Listed Species and Species of Special Concern

MEC holds a Scientific Collector Permit (Permit Number SC1193), issued by the IDNR that covers activities to support the development of the HCP and an associated ESA Section 6 Habitat Conservation Planning Grant. MEC is actively coordinating with the IDNR to ensure compliance with applicable State laws and regulations. Mitigation under the alternatives would provide up to 3,200 acres of preserved or restored forested habitat, which could benefit state-listed species and/or species of special concern that are associated with forested habitat. A complete list of species can be found in the IDNR Wildlife Action Plan (IDNR 2012, 2015).

3.2.8 Land Use and Land Cover

Covered projects are already built and operating. Therefore, changes in project operations as a result of implementing the HCP or any of the alternatives will not affect land cover or land use. Likewise, monitoring will occur on existing roads and pads and therefore not involve changes to land use or land cover.

Mitigation will involve preservation, enhancement, and/or restoration of forested bat habitat. The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative from 768 acres to 3,200 acres and from 25 structures to 50 structures. If all mitigation were to be conducted on farmland, the conversion of 3,200 acres of farmland into forested habitat represents approximately 0.01% of that land.

3.3 WILDLIFE RESOURCES

3.3.1 Scope of Analysis

This section describes non-listed and non-covered wildlife resources affected by the project (bats and birds). The analysis area for wildlife includes the entire state of Iowa. Threatened and endangered species, as well as additional covered species, are discussed in Section 3.4. Birds and bats, which are of particular concern for operating wind farms, are discussed in detail below.

3.3.2 Existing Conditions

3.3.2.1 Bats Not Listed Under the ESA or Covered by the HCP

There are nine species of bats which occur regularly in Iowa (Laubach et al. 1988). This section focuses on the non-listed and non-covered species, including the big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), evening bat (*Nycticeius humeralis*), and silver-haired bat (*Lasionycteris noctivagans*). The other four species of bats in Iowa, the Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat, are discussed in Section 3.4, as they are either federally-listed as threatened or endangered or MEC is covering them under the HCP.

Bats are ecologically and economically important, specifically in the Midwest, as they are predators of nocturnal insects, including many crop pests (Boyles et al. 2011). The value of their economic importance in agricultural systems ranges from about $12 to $173 per acre (most likely scenario of approximately $74/acre; Cleveland et al. 2006), for a total service to U.S. farmers totaling billions of dollars. The pressure exerted by insectivorous bats on crop pests has been shown to reduce damage to corn plants, as well as suppress pest-associated fungal growth (Maine and Boyles 2015). The economic value of insectivorous bats in the state of Iowa is approximately $1.9 billion (based on 25,968,200 acres of cropland in Iowa; USDA 2018). We have been unable to find sufficient information from which to derive a meaningful weight of insects consumed or reduction in pesticide use per bat value. Therefore, we are not able to analyze how many fewer insects would be consumed or how much additional pesticides would need to be applied as a result of the loss of bats under each alternative. However, we acknowledge here that the bat fatalities under any of the alternatives would result in some decrease in pest control services and possible increase in pesticide use.

The bats in Iowa can be divided into two categories, either cave bats or migratory tree bats, based upon their winter habitat. The big brown bat is the only non-listed and non-covered cave bat species in Iowa, and the other four species (eastern red bat, hoary bat, silver-haired bat, and evening bat) are all migratory tree bats. Migratory tree bat species are particularly susceptible to operational impacts from wind energy facilities. Forested habitat is limited within the state, with less than 10% of land cover attributable to forested habitats, which is primarily associated with rivers and streams. Forested habitat within MEC's covered projects is also limited, with most sites having 1% or less forest cover. Macksburg is the exception, with approximately 6% forest cover. Research has shown that bat activity in open areas (such as the agricultural landscape of most of Iowa) is higher when closer to forested habitat (i.e., along forest edges; Heim et al. 2015). Neither the local nor the total population size is currently known for any species of migratory tree bat.

MEC has conducted several different studies focused on bats at its covered projects, including a desktop habitat assessment and acoustic presence/absence surveys for Indiana and northern long-eared bats (WEST 2016a), a mist-net survey and radio-telemetry at Macksburg and nearby IDNR lands (WEST 2016b), and post-construction fatality monitoring for bats (Bay et al. 2016a, 2017a). The 2015 Indiana and northern long-eared bat survey included desktop habitat assessments and acoustic presence/absence surveys for the two listed species, and the results of those surveys are discussed in Sections 3.4.2.2.1.4 and 3.4.2.2.2.4. The other surveys are discussed in detail below.

3.3.2.1.1 Mist-Net Survey

WEST (2016b) conducted mist-net surveys at five sites at Macksburg, along with two IDNR sites located south of the project (Sand Creek Wildlife Management Area and Dekalb Wildlife Management Area) between August 17, 2015, and October 11, 2015. The surveys were focused on the northern long-eared bat (see Section 3.4.2.2.2.4 for more details), but a total of 76 bats of 7 species were captured, including the following non-listed and non-covered species:

- 30 big brown bats (39.5% of all captures)

- 11 evening bats (14.5% of all captures)
- 10 eastern red bats (13.2% of all captures)
- 3 hoary bats (3.9% of all captures)
- 2 silver-haired bats (2.6% of all captures)

The remaining 20 captures were northern long-eared bats (discussed in Section 3.4.2.2.2.4) and little brown bats (discussed in Section 3.4.2.3.1). No telemetry was conducted on the non-listed species.

3.3.2.1.2 Post-Construction Monitoring

Post-construction monitoring has been conducted at 21 of MEC's covered projects (Table 3.3-1). Post-construction monitoring was not conducted at the State Fair Turbine.

Table 3.3-1. Fatality estimates by site (bats/turbine/year) based on post-construction monitoring from 2014-2015 (Bay et al. 2016a), 2015-2016 (Bay et al. 2017a), 2016-2017 (Bay et al. 2017b), and 2017-2018 (Baumgartner et al. 2018a). A 90% confidence interval is provided in parentheses. Projects not surveyed during a particular study are indicated with n/a (though it is assumed the projects still had bat fatalities during those years, they just were not studied to get an estimate).

Facility	2014-2015	2015-2016	2016-2017	2017-2018
Adair	32.32 (22.01-50.80)	*n/a*		
Adams	*n/a*		22.69 (18.99-28.04)	*n/a*
Carroll	17.56 (12.08-25.53)	*n/a*	*n/a*	
Century	*n/a*	13.61 (10.39-20.89)	*n/a*	
Charles City	*n/a*	15.62 (11.79-21.67)	*n/a*	
Eclipse	23.03 (16.75-31.54)	*n/a*	*n/a*	
Highland	*n/a*	20.24 (14.08-30.36)	*n/a*	
Ida Grove	*n/a*			69.4 (55.86-87.30)
Intrepid	*n/a*	27.55 (12.82-47.85)	*n/a*	
Laurel	*n/a*	32.71 (22.21-56.45)	*n/a*	
Lundgren	67.42 (55.02-86.55)	20.64 (16.52-29.17)	*n/a*	

Facility	2014-2015	2015-2016	2016-2017	2017-2018
Macksburg	171.44 (121.46-266.38)	25.31 (18.55-38.42)	*n/a*	
Morning Light	46.45 (28.99-75.59)	*n/a*		
O'Brien	*n/a*			47.47 (32.73-78.29)
Pomeroy	*n/a*	9.38 (7.26-15.37)	*n/a*	
Rolling Hills	14.10 (10.99-18.08)	14.48 (11.55-20.73)	*n/a*	
State Fair	*n/a*			
Victory	9.72 (4.55-16.49)	*n/a*		
Vienna I	*n/a*	21.32 (15.72-32.23)	*n/a*	
Vienna II	*n/a*	24.11 (14.0-45.41)	*n/a*	
Walnut	32.54 (22.64-47.50)	*n/a*	*n/a*	
Wellsburg	*n/a*	28.87 (21.58-46.54)	*n/a*	

A total of 3,785 bats have been discovered during post-construction monitoring, of which 3,665 were non-listed and non-covered species (Table 3.3-2). Over 70% of fatalities are attributed to two species, the eastern red bat and the hoary bat (Table 3.3-2).

Table 3.3-2. Species composition of bat fatalities found at MEC's covered projects during post-construction monitoring conducted between 2014 and 2018 for non-listed and non-covered bat species (Bay et al. 2016a, 2017a, 2017b; Baumgartner et al. 2018a). The percent compositions are of all bat fatalities, and thus do not add to 100% as covered species are not included.

Species	Total Found	% Composition
Eastern red bat	1,462	38.6%
Hoary bat	1,225	32.4%
Big brown bat	530	14.0%
Silver-haired bat	354	9.4%
Evening bat	94	2.5%

3.3.2.2 Birds

More than 180 bird species historically nested within the state of Iowa (IDNR 2015). Common neotropical migrants include ruby-throated hummingbird (*Archilochus colubris*), purple martin (*Progne subis*), gray catbird (*Dumetella carolinensis*), wood thrush (*Hylocichla mustelina*), red-eyed vireo (*Vireo olivaceus*), American redstart (*Setophaga ruticilla*), bobolink (*Dolichonyx oryzivorus*), Baltimore oriole (*Icterus galbula*), scarlet tanager (*Piranga olivacea*), and rose-breasted grosbeak (*Pheucticus ludovicianus*; Jackson et al. 1996). Other common birds include the mourning dove (*Zenaida macroura*), northern flicker (*Colaptes auratus*), eastern wood pee-wee (*Contopus virens*), barn swallow (*Hirundo rustica*), house wren (*Troglodytes aedon*), brown thrasher (*Toxostoma rufum*), American robin (*Turdus migratorius*), eastern bluebird (*Sialia sialis*), house sparrow (*Passer domesticus*), brown-headed cowbird (*Molothrus ater*), red-winged blackbird (*Agelaius phoeniceus*), eastern meadowlark (*Sturnella magna*), northern cardinal (*Cardinalis cardinalis*), American goldfinch (*Spinus tristis*), and song sparrow (*Melospiza melodia*; Jackson et al. 1996).

Common waterfowl include pied-billed grebe (*Podilymbus podiceps*), Canada goose (*Branta canadensis*), mallard, blue-winged teal (*Anas discors*), and wood duck (*Aix sponsa*). Upland game birds include wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), northern bob-white (*Colinus virginianus*), gray partridge (*Perdix perdix*), and ruffed grouse (*Bonasa umbellus*). Birds of prey include eastern screech owl (*Megascops asio*), barred owl (*Strix varia*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), cooper's hawk (*Accipiter cooperii*), bald eagle (see Section 3.4.2.1 for more details on this species), and American kestrel (*Falco sparverius*). Shorebirds include great blue heron (*Ardea herodias*), American bittern (*Botaurus lentiginosus*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), and spotted sandpiper (*Actitis macularius*; Jackson et al. 1996).

The Service designated Bird Conservation Regions (BCRs) in 2008, three of which include portions of the state of Iowa – BCR 11 (Prairie Potholes), BCR 22 (Eastern Tallgrass Prairie) and BCR 23 (Prairie Hardwood Transition; USFWS 2008). Within each BCR, Birds of Conservation Concern (BCC) species are identified as those species which have further causes for conservation concern. BCC species are not afforded any additional federal protections; however, they are recognized by the Service as species, subspecies, or populations of migratory nongame birds that are likely to become candidates for listing under the ESA without additional conservation measures. As these are the species which the Service has identified as highest concern (other than federally-listed threatened or endangered species), they are the focus of this non-listed avian species analysis. BCC species identified for these regions are summarized in Table 3.3-3.

Table 3.3-3. Birds of Conservation Concern species within the Eastern Tallgrass Prairie, Prairie Potholes, and Eastern Hardwood Transition Bird Conservation Regions (USFWS 2008), their habitat preference, and general information on their status within Iowa.

Common Name	Scientific Name	Habitat Preference[1]	State Status and Comments[2]
Acadian Flycatcher	*Empidonax virescens*	Woodland	Rare summer resident in heavily wooded river valleys of eastern and central Iowa
American Bittern	*Botaurus lentiginosus*	Marsh	Rare migrant and nesting species in Iowa, occurs in dense emergent vegetation throughout the state
Baird's Sparrow	*Ammodramus bairdii*	Mixed grasslands	No records in Iowa; not found in Iowa breeding bird atlas
Bald Eagle	*Haliaeetus leucocephalus*	Open water along rivers and reservoirs (winter)	State-listed and protected by the BGEPA, and is a covered species in the HCP (see Section 3.4.2.1)
Bell's Vireo	*Vireo bellii*	Riparian corridors	Rare to locally uncommon summer resident in southern, central and east-central Iowa in hedgerows and thickets
Bewick's Wren	*Thryomanes bewickii*	Woodlands and shrublands	Rare summer resident found in thick brushy habitats in south-eastern Iowa
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Successional areas	Uncommon summer resident
Black-crowned Night Heron	*Nyticorax nycticorax*	Marsh	Uncommon migrant and rare summer resident found in lakes or marshes
Black Rail	*Laterallus jamaicensis*	Marsh	Accidental species in Iowa; not found in Iowa breeding bird atlas
Black Tern	*Chlidonias niger*	Marsh/wetlands	State-listed
Blue-winged Warbler	*Vermivora pinus*	Woodlands; meadows	Uncommon summer resident in Iowa, breeding in eastern, central and south-central Iowa
Bobolink	*Dolichonyx oryzivorus*	Open grasslands	Common summer resident
Brown Thrasher	*Toxostoma rufum*	Urban and rural woodlands	Common summer resident and rare winter resident

Common Name	Scientific Name	Habitat Preference[1]	State Status and Comments[2]
Buff-breasted Sandpiper	*Tryngites subruficollis*	Plowed fields during migration	Rare migrant in Iowa; not found in Iowa breeding bird atlas
Cerulean Warbler	*Dendroica cerulean*	Large wooded tracts	Rare summer resident in eastern Iowa along the Mississippi and its tributaries and in Central Iowa along the Des Moines River
Chestnut-collared Longspur	*Calcarius ornatus*	Short grass prairie	Accidental species in Iowa; not found in Iowa breeding bird atlas
Common Tern	*Sterna hirundo*	Coastal habitat	Rare species in Iowa; not found in Iowa breeding bird atlas
Dickcissel	*Spiza americana*	Grassland	Abundant summer resident throughout the state
Field Sparrow	*Spizella pusilla*	Overgrown pasture, brushy roadsides	Common summer resident.
Golden-winged Warbler	*Vermivora chrysoptera*	Woodlands	Rare migrant in Iowa; no confirmed breeding records in Iowa breeding bird atlas
Grasshopper Sparrow	*Ammodramus savannarum*	Grassland	Common summer resident
Henslow's Sparrow	*Ammodramus henslowii*	Grassland	State-listed
Horned Grebe	*Podiceps auritus*	Lakes and ponds	Uncommon migrant in Iowa; not found in Iowa breeding bird atlas
Hudsonian Godwit	*Limosa haemastica*	Marshes, prairie pools, mudflats	Rare to uncommon spring migrant in Iowa; not found in Iowa breeding bird atlas
Kentucky Warbler	*Oporornis formosus*	Woodland	Rare summer resident
Least Bittern	*Ixobrychus exilis*	Marsh/wetland and lakes	Rare summer resident
Loggerhead Shrike	*Lanius ludovicianus*	Open brushy areas	Rare summer resident in northern Iowa and uncommon summer and winter resident in southern Iowa
Long-billed Curlew	*Numenius americanus*	Grassland	Accidental in Iowa; not found in Iowa breeding bird atlas

Common Name	Scientific Name	Habitat Preference[1]	State Status and Comments[2]
Marbled Godwit	*Limosa fedoa*	Wetlands and grasslands	Rare migrant in Iowa; not found in Iowa breeding bird atlas
Marsh Wren	*Cistothorus palustris*	Wetlands	Uncommon migrant and summer resident
McCown's Longspur	*Rhynchophanes mccownii*	Short grass prairie	No accepted records of this species in Iowa; not found in Iowa breeding bird atlas
Mountain Plover	*Charadrius montanus*	Shorebird	No accepted records of this species in Iowa; not found in Iowa breeding bird atlas
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsoni*	Wet meadows	Rare migrant in Iowa; not found in Iowa breeding bird atlas
Northern Flicker	*Colaptes auratus*	Woodland edge and shelterbelts	Present year-round, uncommon in winter, abundant during migration, and common in summer
Peregrine Falcon	*Falco peregrinus*	Bluffs/cliffs along rivers and lakes	State-listed
Pied-billed Grebe	*Podilymbus podiceps*	Marsh	Common migrant and fairly common summer migrant throughout Iowa
Prothonotary Warbler	*Protonotaria citrea*	Woodland	Rare summer resident, distribution follows major rivers
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Woodland	Common to abundant resident year-round
Red Knot (*Roselaari ssp.)*		Shoreline	Not found in Iowa breeding bird atlas
Red Knot (*Rufa ssp.)*	*Calidrus canutus*	Shoreline	Casual species in Iowa; not found in Iowa breeding bird atlas
Rusty Blackbird	*Euphagus carolinus*	Wet woodlands; swamps	Uncommon migrant and rare winter resident in Iowa; not found in Iowa breeding bird atlas
Short-billed Dowitcher	*Limnodromus griseus*	Shoreline; shallow water	Migrant in Iowa; not found in Iowa breeding bird atlas

Common Name	Scientific Name	Habitat Preference[1]	State Status and Comments[2]
Short-eared Owl	*Asio flammeus*	Large open areas and grasslands	State-listed
Smith's Longspur	*Calcarius pictus*	Wet meadows and grassy areas	Rare spring migrant in Iowa; not found in Iowa breeding bird atlas
Solitary Sandpiper	*Tringa solitaria*	Shallow marsh	Migrant in Iowa; not found in Iowa breeding bird atlas
Sprague's Pipit	*Anthus spragueii*	Grassland	No confirmed records of this species in Iowa; not found in Iowa breeding bird atlas
Upland Sandpiper	*Bartramia longicauda*	Prairie, hayfields, and pasture	Uncommon to rare nesting species in grassland areas
Whimbrel	*Numenius phaeopus*	Wetlands	Casual species in Iowa, typically during late spring migration; not found in Iowa breeding bird atlas
Whip-poor-will	*Caprimulgus vociferus*	Woodland	Not often reported, making it difficult to quantify abundance and distribution
Willow Flycatcher	*Empidonax traillii*	Swampy thickets	Uncommon and local summer resident
Wood Thrush	*Hylocichla mustelina*	Woodland	Uncommon summer resident
Yellow Rail	*Coturnicops noveboracensis*	Sedge marshes	Rare migrant in Iowa; not found in Iowa breeding bird atlas

[1] Data sources include Jackson et al. 1996, Sibley 2000, and USFWS 2008.
[2] Data sources include Kent and Dinsmore 1996 and the Iowa Breeding Bird Atlas (Jackson et al. 1996). Species status is defined as regular (seen every year or nearly every year, at least 8 out of 10 years), casual (seen many years but not all, at least 3 and fewer than 9 out of 10 years), accidental (seen once to several times, but fewer than 5 out of 10 years), abundant (>200 per season), common (25-249 per season), uncommon (5-24 per season), rare (1-4 per season), and very rare (easy to miss in a given year).

Of the BCC species, the peregrine falcon, short-eared owl, black tern, and Henslow's sparrow are also state-listed. The bald eagle is both state-listed and protected by the BGEPA and is a covered species in the HCP (see Section 3.4.2.1).

3.3.2.2.1 Avian Use Surveys

Avian use surveys were conducted at 18 of the projects between December 2015 and February 2016 (WEST 2016c). Of the 124,586 observations that were identified to the species level, 120 species were recorded (WEST 2016c). The 10 most commonly recorded species were: Canada goose, snow goose

(*Chen caerulescens*), European starling (*Sturnus vulgaris)*, rock pigeon (*Columba livia*), American robin, turkey vulture (*Cathartes aura*), lapland longspur (*Calcarius lapponicus*), common grackle (*Quiscalus quiscula)*, American crow (*Corvus brachyrhynchos*), and horned lark (*Eremophila alpestris)*.

A total of 15 BCC species (excluding state-listed species and bald eagles, which are discussed in section 3.3) were observed (Table 3.3-4).

Table 3.3-4. Summary of BCC species by project observed during avian surveys conducted between December 2015 and February 2016. An "X" indicates whether a species was observed at that particular facility. This list excludes BCC species which are also state-listed, as well as the bald eagle. Projects not surveyed during this study are indicated with n/a.

Facility	Swainson's Hawk	Upland Sandpiper	Black-billed cuckoo	Red-headed Woodpecker	Northern Flicker	Loggerhead Shrike	Bell's Vireo	Field Sparrow	Grasshopper Sparrow	Smith's Longspur	Dickcissel	Rusty Blackbird	Bobolink	Brown Thrasher	Willow Flycatcher
Adair (combined with Morning Light)				X				X	X		X		X	X	
Adams	*n/a*														
Carroll	X	X						X			X			X	
Century		X			X									X	
Charles City														X	X
Eclipse		X		X	X	X		X			X		X	X	
Highland	X	X			X						X				
Ida Grove	*n/a*														
Intrepid		X		X	X						X		X	X	
Laurel				X	X						X			X	
Lundgren		X		X	X						X				

Facility	Swainson's Hawk	Upland Sandpiper	Black-billed cuckoo	Red-headed Woodpecker	Northern Flicker	Loggerhead Shrike	Bell's Vireo	Field Sparrow	Grasshopper Sparrow	Smith's Longspur	Dickcissel	Rusty Blackbird	Bobolink	Brown Thrasher	Willow Flycatcher
Macksburg	X	X		X	X	X		X	X		X		X	X	
Morning Light	*See Adair; facilities combined for this survey*														
O'Brien	*n/a*														
Pomeroy	X				X						X		X		
Rolling Hills	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
State Fair	*n/a*														
Victory		X		X	X						X		X	X	
Vienna I (combined with Vienna II)		X									X				
Vienna II	*See Vienna I; facilities were combined for this survey*														
Walnut		X		X				X			X			X	
Wellsburg				X	X						X		X	X	

Species richness was highest at Rolling Hills, with 95 unique species observed, and lowest at Carroll, Victory, and Walnut, which each had 42 species observed.

3.3.2.2.2 Post-Construction Fatalities at MidAmerican's Wind Energy Facilities

Post-construction monitoring has been conducted at 21 of MEC's covered projects (Table 3.3-5). Post-construction monitoring was not conducted at the State Fair Turbine.

Table 3.3-5. Fatality estimates by site (birds/turbine) based on post-construction monitoring from 2014-2015 (Bay et al. 2016a), 2015-2016 (Bay et al. 2017a), and 2016-2017 (Bay et al. 2017b) and 2017-2018 (Baumgartner et al. 2018a). Estimates were calculated separately for small birds, large birds, raptors, and combined for all birds. A 90% confidence interval is provided when the number of fatalities was greater than 5. Projects not surveyed during a particular study are indicated with n/a. If no species were found for a certain category, no estimate could be developed, and this is indicated with a --.

Facility	2014-2015				2015-2016				2016-2017, 2017-2018			
	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird
Adair	9.28 (4.60-17.34)	1.39 (0.56-2.43)	0.15	10.67 (6.03-18.84)	*n/a*				*n/a*			
Adams	*n/a*				2.48 (0.63-5.21)	1.29	--	3.77 (1.62-6.98)	5.97 (0.85-15.07)	5.12 (0.40-14.96)	--	11.09 (2.65-23.41)
Carroll	4.54 (2.27-9.32)	0.79 (0.30-1.44)	--	5.33 (2.96-10.31)	*n/a*				*n/a*			
Century	*n/a*				3.63 (2.34-6.26)	1.69 (0.87-2.80)	0.02	5.31 (3.80-8.12)	*n/a*			
Charles City	*n/a*				6.09 (3.55-9.68)	0.11	--	6.20 (3.64-9.82)	*n/a*			
Eclipse	7.24 (4.24-11.36)	1.08 (0.44-1.78)	0.28	8.32 (5.29-12.59)	*n/a*				*n/a*			
Highland	*n/a*				4.18 (2.86-5.52)	1.10 (0.59-1.84)	--	5.29 (3.87-6.75)	*n/a*			

Facility	2014-2015				2015-2016				2016-2017, 2017-2018			
	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird
Ida Grove	*n/a*								3.32 (2.58-4.62)	0.43 (0.18-0.74)	0.1 (0-0.24)	3.75 (2.98-5.14)
Intrepid	*n/a*				3.20 (1.97-4.84)	1.20 (0.47-2.34)	0.03	4.40 (2.93-6.26)	*n/a*			
Laurel	*n/a*				5.65 (2.77-10.44)	1.16 (0.35-2.43)	--	6.81 (3.71-12.08)	*n/a*			
Lundgren	6.54 (4.03-9.76)	0.29	--	6.84 (4.35-10.10)	7.15 (4.54-9.88)	0.75 (0.05-2.22)	--	7.90 (5.18-10.97)	*n/a*			
Macksburg	3.77	4.15 (2.07-6.85)	--	7.92 (3.57-13.45)	5.37 (2.89-8.65)	6.22 (2.08-13.64)	0.04	11.59 (6.87-19.15)	*n/a*			
Morning Light	5.10 (1.86-10.25)	0.33	--	5.44 (2.11-10.48)	*n/a*				*n/a*			
O'Brien	*n/a*								1.49 (0.85-2.28)	1.08 (0.49-2.18)	0.15 (0-0.52)	2.57 (1.63-4.03)
Pomeroy	*n/a*				2.78 (1.61-4.17)	1.35 (0.64-2.38)	0.29	4.13 (2.72-5.95)	*n/a*			
Rolling Hills	3.54 (2.16-5.36)	0.57 (0.22-1.01)	0.10	4.11 (2.64-6.04)	6.01 (4.11-9.64)	1.99 (1.09-3.39)	0.18	8.0 (5.91-11.99)	*n/a*			

Facility	2014-2015				2015-2016				2016-2017, 2017-2018			
	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird	Small Bird	Large Bird	Raptor	All Bird
State Fair	*n/a*								*n/a*			
Victory	1.90	0.39	--	2.28 (0.85-4.48)	*n/a*				*n/a*			
Vienna I	*n/a*				11.91 (7.57-19.09)	1.46 (0.36-3.04)	0.07	13.37 (8.81-20.45)	*n/a*			
Vienna II	*n/a*				6.43 (1.75-14.84)	1.94	0.17	8.37 (3.41-16.73)	*n/a*			
Walnut	4.10 (2.24-6.49)	0.22	--	4.32 (2.38-6.77)	*n/a*				*n/a*			
Wellsburg	*n/a*				18.08 (10.53-30.74)	1.72 (0.51-3.54)	--	19.79 (12.16-32.69)	*n/a*			

A total of 1,114 birds were discovered during post-construction monitoring, representing 130 identified species. Passerines (i.e., songbirds) were the most commonly found fatality, making up 67.4% of all fatalities, followed by gamebirds (9.3%), raptors (8.3%), shorebirds (6.0%), waterbirds (4.9%), woodpeckers (1.0%), and wading birds (0.4%). By species, the nine most commonly found species were:

- Golden-crowned kinglet (*Regulus satrapa*) – 72 fatalities (6.5% of all fatalities)
- Ruby-crowned kinglet (*Regulus calendula*) – 57 fatalities (5.1% of all fatalities)
- Killdeer – 49 fatalities (4.4% of all fatalities)
- European starling – 46 fatalities (4.1% of all fatalities)
- Turkey vulture – 42 fatalities (3.8% of all fatalities)
- Ring-necked pheasant – 36 fatalities (3.8% of all fatalities)
- Red-tailed hawk – 30 fatalities (2.7% of all fatalities)
- Horned lark – 27 fatalities (2.4% of all fatalities)
- Nashville warbler – 27 fatalities (2.4% of all fatalities)

All avian species found during post-construction monitoring from 2014-2015, 2015-2016, 2016-2017, and 2017-2018 can be found in the post-construction monitoring report in the HCP Addendum (Bay et al. 2016a, 2017a, 2017b; Baumgartner et al. 2018a).

A total of 60 BCC fatalities (excluding eagles and state-listed species) of 13 species were found during post-construction monitoring (5.4% of all fatalities), including:

- Marsh wren (*Cistothorus palustris*) – 16 fatalities
- Dickcissel (*Spiza americana*) – 15 fatalities
- Northern flicker – 7 fatalities
- Upland sandpiper (*Bartramia longicauda*) – 6 fatalities
- Field sparrow (*Spizella pusilla*) – 3 fatalities
- Pied-billed grebe – 3 fatalities
- Bobolink – 2 fatalities
- Black-billed cuckoo (*Coccyzus erythropthalmus*) – 2 fatalities
- Acadian flycatcher (*Empidonax virescens*) – 1 fatality
- Brown thrasher – 1 fatality
- Grasshopper sparrow (*Ammodramus savannarum*) – 1 fatality
- Yellow rail (*Coturnicops noceboracensis*) – 1 fatality
- Rusty blackbird (*Euphagus carolinus*) – 1 fatality

3.4 RARE, THREATENED, ENDANGERED AND OTHER COVERED WILDLIFE SPECIES

3.4.1 Scope of Analysis

This section describes federally- and state-listed wildlife resources, as well as other non-listed species MEC has requested take coverage for, and eagles which are protected by the BGEPA. The analysis area for rare, threatened, endangered, and other covered wildlife species includes the entire state of Iowa.

3.4.2 Existing Conditions

3.4.2.1 Bald and Golden Eagles

3.4.2.1.1 Bald Eagle

3.4.2.1.1.1 Status and Distribution

The bald eagle was listed as an endangered species in 1966 under the Endangered Species Preservation Act, when the entire population in the lower 48 states was estimated at 834 individuals. It was delisted in 2007 when recovery objectives were met, and by 2009, the population in the lower 48 states alone was estimated at 97,956 individuals (USFWS 2009). The bald eagle remains protected under the BGEPA (see Section 1.3.3) and is a special concern species in Iowa.

The breeding range of the bald eagle coincides with rivers, lakes, and coastal areas throughout North America. Many eagles, particularly those at inland breeding grounds north of 40°N latitude, either migrate south for the winter along river systems to portions of the United States, including Iowa, with suitable food resources and roosting sites or move to nearby coastal areas or rivers that do not freeze (Buehler 2000). By contrast, those at more southern latitudes typically remain at their breeding grounds year-round. Bald eagles breeding in the northern United States typically migrate south along river systems or to the nearest coast; those that do not migrate move to the nearest food source (Swenson et al. 1986; Buehler 2000), such as power plant discharge areas or locations with sufficient carrion. In Iowa, wintering bald eagles are commonly observed congregating near livestock operations, sometimes a long distance from a river or other waterbody.

3.4.2.1.1.2 Habitat Characteristics and Use

Northern breeding populations return to their breeding grounds between January and March (Buehler 2000). Bald eagles typically nest along forested coasts, rivers, streams, reservoirs, or large lakes (Buehler 2000; USFWS 2009). Nests are often constructed in mature or old-growth trees and snags within 1.24 miles of food resources (Buehler 2000; USFWS 2009) and less commonly on cliffs, rocky outcrops, and human-made structures (USFWS 2009). Bald eagles typically choose the largest nest tree available having a limb structure that supports their heavy nests and provides good visibility and easy access (Buehler 2000). Eagles also tend to select nest trees that, on average, are more than 547 yards from

human development, although some will build within 109 yards of development (Buehler 2000). Nest tree diameter ranges from 20 to 75 inches, and nest height ranges from 22 to 66 yards (Stalmaster 1987). Nests generally are built against or near the tree trunk and just below the crown of the tree (Buehler 2000).

Bald eagle home range size varies based upon location, time of year, breeding status, and food availability (Griffen and Baskett 1985; Buehler 2000). Bald eagles defend territories, often using the same territory each year (USFWS 2009). Territory size ranges from 0.19 to 1.5 square miles (Hodges and Robards 1982; Stalmaster 1987; Gerrard et al. 1992; Buehler 2000). Egg laying may occur as early as February or as late as April, depending on the region. The incubation period is usually around 35 days (Buehler 2000), and fledging is typically between June and August.

Bald eagles primarily hunt from perches or by soaring over foraging areas. Bald eagles usually soar above areas of open water while hunting, although they may at times soar over land (Buehler 2000). The typical diet of a bald eagle consists primarily of fish, but it will also eat birds, mammals, and reptiles (Buehler 2000). While most prey is captured while flying, eagles opportunistically feed on carrion.

3.4.2.1.1.3 Population Status and Threats

The use of the pesticide dicholoro-diphenyl-trichloroethane (DDT), and other types of human-caused mortality, caused the global population of bald eagles to drop to an all-time low in the mid to late 1900s, with only 417 breeding pairs in the contiguous United States in 1963 (Buehler 2000). In the decades after listing under the ESA and a ban on DDT, the bald eagle population rebounded to 9,789 breeding pairs in the lower 48 states in 2006, and by 2009 the population in the lower 48 states alone was estimated at 97,956 individuals (USFWS 2009).

Primary ongoing human threats to bald eagles include disturbance and habitat loss from human development, collisions with manmade structures, electrocution, environmental contaminants, illegal take, and climate change (Fraser et al. 1996, as cited in USFWS 2016b; Buehler 2000; Allison 2012).

Direct and indirect disturbance by human development may cause temporary or permanent loss of nesting, hunting, or roosting habitat (Fraser 1985 as cited in USFWS 2016b; Buehler 2000; USFWS 2009). Collisions with vehicles, aircraft, and trains, as well as collisions or electrocutions with overhead lines account for hundreds of bald eagle fatalities (Allison 2012). To date, however, based upon publicly available information, only eight known bald eagle fatalities have been due to turbine collisions, representing less than one percent of all human-caused fatalities (Allison 2012; Pagel et al. 2013). According to Allison (2012), electrocution accounts for 10.4 percent of all fatalities. Poisoning from environmental contaminants including lead shot, heavy metals, pesticides, and oil spills are another major source of mortality in bald eagles (Buehler 2000). Eagles are also killed by people shooting, trapping, and deliberately poisoning them. Climate change threatens bald eagles and has been implicated in shifting egg-laying dates and changes in winter range (Allison 2012).

3.4.2.1.1.4 Occurrence in Iowa

Iowa is in the USFWS Mississippi Flyway bald eagle management unit (USFWS 2016b). Major river systems, such as the Des Moines, Missouri, and Mississippi rivers, harbor the largest concentration of eagles during the winter. Lower occurrences can be found on the Iowa, Skunk, Wapsipinicon, Turkey, South Maquoketa, Maquoketa, and Cedar rivers.

Eagle nests have been reported from all 99 counties in Iowa, and over 863 territories have been reported to the IDNR since 1977 (IDNR 2016, as cited in MEC 2017). In 2016, 412 territories were documented as "active" by the state, and 238 had an unknown activity status (IDNR 2016a). Thus, the actual number of active nests likely ranges between 412 and 650 (if all unknown nests were active), though it may be higher due to nests which have not been reported to the IDNR.

The population size of breeding bald eagles in Iowa was estimated two ways: first using state-level nest data, and second using published bald eagle densities. Based upon the nest data reported above, and using the 2016 USFWS population size calculation[11], the total population of breeding bald eagles in Iowa is estimated to be between 1,916 and 3,024 birds. Based on published bald eagle density data for USFWS Region 3[12] (0.062 bald eagle per square mile; USFWS 2013), the population of bald eagles in Iowa is estimated to be 3,489 birds.

Additionally, many thousands of bald eagles migrate through, and overwinter in, Iowa (IDNR 2010). The number of bald eagles that overwinter within the state has been generally increasing, with an estimated increase of 4.3% per year (adult eagles; 4.1% per year for juveniles) between 1986 and 2010 (Eakle et al. 2015). The 10-year average number of eagles counted during the midwinter surveys in Iowa between 2007 and 2016 was 2,726 (IDNR 2016, as cited in MEC 2017), with the highest number of eagles recorded in 2014, at 4,957 (IDNR 2014, as cited in MEC 2017).

MEC has conducted four different studies focused on, or including, eagles at its covered projects, which include: avian use surveys (WEST 2016c), raptor nest search (Chodachek et al. 2015), eagle use surveys (Simon et al. 2016), and post-construction fatality monitoring (Bay et al. 2016b, 2017b)

The results of these surveys, as they pertain to bald eagles, are summarized in Table 3.4-1. Bald eagles were observed at all facilities surveyed during avian use surveys and eagle use surveys. Bald eagle nests were observed within 5 miles of the project area at 11 of the facilities surveyed. Six bald eagles have been recorded as fatalities at MEC's covered projects, including Carroll (found on March 10, 2015), Charles City (found on October 22, 2016), Highland (found on February 17, 2016 and on March 7, 2017), Macksburg (found on December 4, 2014), and Rolling Hills (found on March 7, 2017).

[11] $N_{TOTAL} = (N_{Occupied\ Territories} * 2) / p\ (Age \geq 4)$ [USFWS 2016c; probability that eagles survive to age 4 or greater is assumed to be 43%]
[12] Includes Minnesota, Iowa, Missouri, Illinois, Wisconsin, Indiana, Michigan, and Ohio.

Table 3.4-1. Summary of bald eagle observations from avian use surveys conducted between December 2015 and February 2016 (WEST 2016c), occupied bald eagle nests from a raptor nest survey conducted in March and April 2015 (Chodachek et al. 2015), bald eagle observations and mean bald eagle use (observations per 800-m survey plot per survey hour) from eagle use surveys conducted from December 2014 to February 2016 (Simon et al. 2016), and bald eagle fatalities from post-construction monitoring conducted from December 2014 to March 2016 (Bay et al. 2016b), November 2015 to March 2017 (Bay et al. 2017c), and March 2017 to March 2018 (Baumgartner et al. 2018b). N/A indicates projects not surveyed during a particular study.

Facility	Avian Use Surveys	Nest Survey	Eagle Use Surveys	Post-Construction
	Bald Eagle Observations	Occupied Bald Eagle Nests within 5-miles	Bald Eagle Observations (mean use)	Bald Eagle Fatalities
Adair	56	0	47 (0.17)	0
Adams	*n/a*			0
Carroll	21	1	16 (0.09)	1
Century	7	1	7 (0.04)	0
Charles City	61	1	59 (0.43)	1
Eclipse	15	0	9 (0.05)	0
Highland	37	1	18 (0.04)	2
Ida Grove	*n/a*			0
Intrepid	20	0	18 (0.08)	0
Laurel	50	0	47 (0.32)	0
Lundgren	38	3	30 (0.11)	0
Macksburg	268	2	234 (1.59)	1
Morning Light	*See Adair; facilities combined for these surveys*			0
O'Brien	*n/a*			0
Pomeroy	14	1	13 (0.05)	
Rolling Hills	431	2	373 (0.90)	1
State Fair	*n/a*			

Facility	Avian Use Surveys	Nest Survey	Eagle Use Surveys	Post-Construction
	Bald Eagle Observations	Occupied Bald Eagle Nests within 5-miles	Bald Eagle Observations (mean use)	Bald Eagle Fatalities
Victory	20	0	9 (0.06)	0
Vienna I	88	1	78 (0.44)	0
Vienna II		*See Vienna I; facilities combined for these surveys*		
Walnut	15	1	15 (0.07)	0
Wellsburg	92	2	76 (0.37)	0

3.4.2.1.2 Golden Eagle

3.4.2.1.2.1 Status and Distribution

The golden eagle is protected under the BGEPA (see Section 1.3.3) and the Migratory Bird Treaty Act (MBTA) and is not currently listed in Iowa. The range of the golden eagle reaches throughout North America, though it is found in the highest abundance in the west near cliffs that provide suitable nesting sites and open hunting habitat (Kochert et al. 2002). Golden eagles no longer breed in the eastern United States (Palmer 1988, as cited in USFWS 2016b), but they continue to breed in northeastern and northcentral Canada and migrate from there to wintering areas in the forested Appalachian Mountains, coastal bays, and estuaries in the eastern United States (Katzner et al. 2012). Regular wintering populations of golden eagles have also been observed in southwestern Wisconsin, southeastern Minnesota, and northeastern Iowa (Mehus and Martell 2010).

3.4.2.1.2.2 Habitat Characteristics and Use

During migration and overwintering, golden eagles are associated with ridges, cliff lines, and escarpments, where they utilize uplift from deflected winds and forage over open landscapes (USFWS 2016b). In the eastern United States, they frequent areas that support large concentrations of waterfowl (Millsap and Vana 1984; Wingfield 1991) as well as relatively densely forested mountainous areas (Katzner et al. 2012). Golden eagles may gather in communal roosts in areas near plentiful food source (Kochert et al. 2002).

Breeding populations return to nesting sites to begin courtship in January (Kochert et al. 2002). Golden eagles in the United States breed in open or semi-open areas in a wide variety of habitats (e.g. tundra, shrubland, grassland, desert rimrock), but they generally avoid urban and heavily-forested areas (Kochert et al. 2002). Golden eagles build nests on cliffs or in the largest trees of forested stands that often afford an unobstructed view of the surrounding habitat (USFWS 2016b). Pairs establish and defend breeding

territories that may contain multiple alternative nests and may be occupied for many decades (Millsap et al. 2015). Adults will remain at nesting sites until young have fledged, typically until late summer.

3.4.2.1.2.3 Population Status and Threats

The golden eagle population in the United States is estimated to be 39,000 individuals, of which 5,000 reside in the eastern United States (USFWS 2016c).

Habitat loss and degradation due to infringement from urbanization (Bittner et al. 2012) and conversion of habitat to agricultural uses (Kochert et al. 2002) have negatively impacted areas historically used by golden eagles. Declines in populations of prairie dogs (a major prey of golden eagles) and availability of nest sites near suitable prey populations may be a habitat-related factor affecting golden eagle populations (Kochert and Steenhof 2002). Most of the remaining prairie dogs in the southern grasslands are associated with playas (dry lake beds or seasonally wet depressions), which are small and dispersed. Declines in prey populations may reduce reproductive performance and survival of young golden eagles (USFWS 2009).

Other potential threats to golden eagles include habitat destruction from increased oil and gas development (conventional and coal bed methane), collision risk with manmade structures (i.e. overhead lines, wind turbines, vehicles, aircraft, etc.), and electrocution risk with overhead lines (USFWS 2009; Pagel et al. 2013)

3.4.2.1.2.4 Occurrence in Iowa

Golden eagles are known to overwinter in northeastern Iowa and are thought to be from populations that breed along the southwestern shore of Hudson Bay in Ontario, Canada (Mehus and Martell 2010). According to Kent and Dinsmore (1996), the golden eagle is a rare migrant and winter resident in Iowa, typically found along wooded, hilly river valleys or near large bodies of water, especially northeastern Iowa along the Upper Iowa River. There is only one summer record in Iowa, from 1930 (Kent and Dinsmore 1996).

During the surveys listed in section 3.4.2.1.1.4 above, golden eagles were observed at Macksburg (two observations) and Rolling Hills (seven observations). Eagle observations were observed during fall and winter season surveys. There were no concentrations of golden eagles observed during any survey. The greatest number of golden eagles observed at any point during surveys was two individuals (Simon et al. 2016). No golden eagles were observed during post-construction fatality monitoring (Bay et al. 2016b, 2017c; Baumgartner et al. 2018b).

3.4.2.2 Federally-listed Species

3.4.2.2.1 Indiana bat

3.4.2.2.1.1 Status and Distribution

The Indiana bat was listed as endangered by the Service in 1967 (32 FR 4001) and is also state-endangered in Iowa. The species is found in forested regions from the United States/Canada border in the northeast, south to the coastal plain, and west to the Kansas/Missouri border. The species was listed due to disturbance of hibernating bats in caves due to human activities, which resulted in the death of large numbers of bats. Populations continue to decline today due to the introduction of white-nose syndrome (WNS; USFWS 2017c). In Iowa, the range includes 38 counties in the southeastern quadrant of the state.

3.4.2.2.1.2 Habitat Characteristics and Use

Indiana bats have the most specialized requirements of any of the covered bat species. In winter, the bats hibernate in caves and mines. Although there are hundreds of documented smaller hibernacula, most Indiana bats are associated with hibernacula that contain more than 1,000 individuals, and 89% of the population is found in the 10 largest hibernacula (USFWS2017c). During summer, most males remain near the hibernaculum, but females may migrate more than 300 miles where they form maternity colonies. Members of a maternity colony may use many roosts per summer, primarily beneath exfoliating bark. Large, dead trees with significant solar exposure (primary roosts) are especially valuable and may be used by the majority of the colony on most days during summer. Secondary roosts are often smaller trees and may be heavily shaded and used most extensively in late summer once juveniles can fly. On rare occasions, anthropogenic (i.e., human made) structures, such as buildings and bat boxes, are used for roosting. Indiana bats forage in open woodlands, forested wetlands, and in edge habitats where true flies, moths, and beetles are found.

3.4.2.2.1.3 Population Status and Threats

The current range-wide population is estimated at 530,705 bats (USFWS 2017c). Within USFWS Region 3, there are 453,731 Indiana bats, or 85.5% of the total 2017 population (USFWS 2017c). The draft Revised Recovery Plan for the Indiana bat divides the species' range into four recovery units based on several factors, such as traditional taxonomic studies, banding returns, and genetic variation (USFWS 2007b). Iowa is within the Ozark-Central Recovery Unit (OCRU), which includes the range of the Indiana bat within Iowa, Illinois, Missouri, Arkansas, and Oklahoma. As of 2017, the estimated population within this recovery unit was 271,965 individuals, or 51.2% of the total population (USFWS 2017c).

Populations of Indiana bats declined rapidly between the 1960s and the early 1990s, likely due to disturbance of hibernating bats, physical changes in hibernacula, chemical contamination, and decline in forest quality. By the mid-1990s, populations in the northeast (especially New York) began to rapidly increase. Populations increased in hibernacula in Indiana, Ohio, and Illinois as well. Populations in the

historic (pre-1980s) Missouri hibernacula within the Ozarks region continued to decline, but many of these bats may have moved to newly available mines located in eastern Missouri and southern Illinois. The arrival of WNS, a fungus that thrives in cold environments, such as caves, caused population declines of over 90% in many of the cave hibernating bats of the northeast United States (USFWS 2017d). The disease has now spread to 31 states and 5 Canadian provinces, and all cave-dwelling bats in the region are at risk (USFWS 2017d). There has been a 20% decline in Indiana bat populations in the past 10 years, since the arrival of WNS in New York (USFWS 2017c).

Other threats faced by Indiana bats include winter disturbance (e.g., people exploring caves and waking bats), chemical contamination, modification of hibernacula, loss of summer habitat, and fatalities at wind energy sites. Seven Indiana bat fatalities were publicly reported range-wide at other wind facilities between 2005 and 2013 (Pruitt and Okajima 2014).

3.4.2.2.1.4 Occurrence in Iowa

The highest summer densities of Indiana bats within the State are found in southern Iowa, and the assumed range includes 38 counties (USFWS 2017b). Twenty-seven maternity colonies were recorded in 2007 in 15 Iowa counties (USFWS 2007a). Two historic hibernacula occur in Iowa; however, recently no Indiana bats have been recorded at these two sites (USFWS 2007a).

Nine of the covered MEC projects fall within counties considered to be within the range of the Indiana bat. WEST (2016a) conducted desktop habitat assessments and acoustic presence/absence surveys at 8 of MEC's covered projects[13], within 2.7 miles of project turbines (1,000 ft. buffer around the turbines, plus areas within 2.5 miles of that buffer). All projects assessed had suitable habitat present within 2.7 miles of project turbines; however, only one project, Laurel, confirmed summer presence of Indiana bats (Table 3.4-2).

Table 3.4-2. Suitable habitat (within 2.7 miles of turbines) and results of presence/absence surveys for Indiana bat (during the summer maternity season) at covered MEC projects within the species' range in Iowa (WEST 2016a). N/A indicates projects not assessed during this study.

Facility	Acres of Suitable Habitat	Presence	Probable Absence
Adair (combined with Morning Light)	106	---	X
Eclipse	81	---	X
Laurel	106	X (1 confirmed call)	---
Macksburg	1,688	---	X
Morning Light	*See Adair; facilities combined for assessment and survey*		

[13] WEST (2016a) combined several adjoining projects (Adair and Morning Light were assessed and surveyed together, and Vienna I and Vienna II were assessed and surveyed together).

Facility	Acres of Suitable Habitat	Presence	Probable Absence
Rolling Hills	1,690	---	X
State Fair Turbine	*n/a*		
Vienna I (combined with Vienna II)	26	---	X
Vienna II	*See Vienna I; facilities combined for assessment and survey*		

All known Indiana bat hibernacula are located more than 20 miles either east or south of the covered MEC facilities. With the recent discovery of a Priority 1 hibernaculum[14] in northeast Missouri, some of the Indiana bats in Iowa may migrate in a southeasterly direction to this hibernaculum. One Indiana bat call was confirmed during acoustic surveys conducted at the Laurel project in Marshall County, indicating summer presence of Indiana bats at this facility (WEST 2016a). No Indiana bats were captured during mist-netting conducted at Macksburg and IDNR lands in the vicinity of Macksburg for the migration study in August 2015 (WEST 2016b).

Post-construction monitoring conducted at 9 of MEC's covered projects in 2015 found a total of 907 bat fatalities composed of 7 species, none of which were Indiana bats (see Section 3.3.2.1; Bay et al. 2016a). In 2016, a total of 2,305 fatalities were found during post-construction monitoring at 13 of the projects, of which 1 was an Indiana bat found at Macksburg (Bay et al. 2017a). In 2017 and 2018, a total of 578 fatalities were found during post-construction monitoring at 3 of the projects, none of which were Indiana bats (Bay et al. 2017b, Baumgartner et al. 2018a).

3.4.2.2.1.5 Critical Habitat

Critical habitat for the Indiana bat was designated in 1977 (42 FR 47840-47845). These areas include caves and mines in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia. There is no designated critical habitat for the Indiana bat in Iowa.

3.4.2.2.2 Northern long-eared bat

3.4.2.2.2.1 Status and Distribution

The northern long-eared bat was listed as threatened by the Service in 2015 (80 FR 17973-18033) and is not currently listed by the state of Iowa. The species occupies forested habitat from the Florida Panhandle north to Nova Scotia and west to Saskatchewan. Prior to the arrival of WNS, northern long-eared bats were common in various habitats, but they were often the most common in areas of dense forest cover, such as Appalachia. Concurrent with the arrival of WNS, northern long-eared bats began to rapidly decline, resulting in the listing of the species by the Service (USFWS 2014).

[14] Indiana bat hibernacula are classified by Priority Number by the USFWS (2007). Priority numbers are based on the size of the current or historic Indiana bat hibernating population. Priority 1 (P1) hibernacula have more than 10,000 individuals. Priority 2 (P2) hibernacula have 1,000 to 10,000 individuals. Priority 3 (P3) hibernacula have 50 to 1,000 individuals, and Priority 4 (P4) hibernacula have fewer than 50 individuals.

3.4.2.2.2.2 Habitat Characteristics and Use

The northern long-eared bat uses a wide variety of habitats year-round. Northern long-eared bats hibernate as individuals or in small clusters in caves and mines. A small portion of the population is observed in caves and mines, often observed in cracks and crevices. During summer, most females form maternity colonies in trees. Large dead trees, typically greater than 3 inches or more diameter at breast height (DBH), are used by northern long-eared bats, but large hollow trees may also be used for multiple years (Laubach et al. 1988; Reid 2006; USFWS 2014). Small trees or shrubs with cavities or loose bark are also used. Northern long-eared bats regularly use bat boxes, especially in woodland areas, but are less likely to be associated with anthropogenic roosts. Northern long-eared bats are insectivores capable of foraging in a variety of settings and feed extensively on moths, beetles, and true flies.

3.4.2.2.2.3 Population Status and Threats

Northern-long-eared bats are in a period of rapid decline, with available data indicating population declines in WNS-affected regions of 99% (USFWS 2014). Threats to this species are similar to those listed for the Indiana bat and include mortality of bats at wind energy sites, deaths due to pesticide poisoning, collisions with vehicles, and bats killed/disturbed when roost trees are disturbed. However, the Service concluded in the final listing decision that the primary and most significant threat to the northern long-eared bat is WNS (81 FR 1900-1922). As of 2016, the range-wide population for northern long-eared bats was estimated at 6,546,718 individuals (USFWS 2016d).

3.4.2.2.2.4 Occurrence in Iowa

Northern long-eared bats occur throughout Iowa (USFWS 2017b), in virtually any habitat where woodlands occur, ranging from isolated woodlots to riparian strips to contiguous forest land. Historically, the landscape of Iowa was dominated by tallgrass prairie with scattered areas of deciduous forest throughout (Auch 2007), but much of this landscape has been converted to cultivated agriculture. Currently, much of the forested habitat suitable to be used by northern long-eared bats for roosting and feeding in the spring, summer, and fall exists in floodplain riparian forest, as well as smaller patches of remaining upland forest, located mostly in the southern and eastern portions of Iowa. Two hibernacula for this species have been recorded in Iowa (USFWS 2016d). Northern long-eared bats have recently been captured in 13 Iowa counties, mostly in the central and southeast parts of the state (USFWS, personal communication), and have been acoustically recorded in 60 counties (Blanchong 2017), though they are assumed to be present state-wide. The estimated population size within Iowa is 102,330 northern long-eared bats as of 2016 (USFWS 2016d).

The entire state of Iowa and all covered MEC projects fall within the range of the northern long-eared bat. WEST (2016a) conducted desktop habitat assessments and acoustic presence/absence surveys at 18 of MEC's covered projects[15], within 2.7 miles of project turbines (1,000 ft. buffer around the turbines, plus

[15] WEST (2016) combined several adjoining projects (Adair and Morning Light were assessed and surveyed together, and Vienna I and Vienna II were assessed and surveyed together).

areas within 2.5 miles of that buffer). All projects (with the exception of the State Fair Turbine) had suitable habitat present within 2.7 miles of project turbines; however, only three projects had confirmed summer presence of northern long-eared bats, including Lundgren, Macksburg, and Rolling Hills (Table 3.4-3).

Table 3.4-3. Suitable habitat (within 2.7 miles of turbines) and results of presence/absence survey for northern long-eared bat (during the summer maternity season) at covered MEC projects in Iowa (MEC 2015; WEST 2016a). N/A indicates projects not assessed during this study.

Facility	Acres of Suitable Habitat	Presence	Probable Absence
Adair (combined with Morning Light)	106	---	X
Adams	127	*n/a*	
Carroll	154	---	X
Century	8	---	X
Charles City	77	---	X
Eclipse	81	---	X
Highland	357	---	X
Ida Grove	39	*n/a*	
Intrepid	175	---	X
Laurel	106	---	X
Lundgren	110	X (4 calls confirmed)	---
Macksburg	1,688	X (19 calls confirmed)	---
Morning Light	*See Adair; facilities combined for assessment and survey*		
O'Brien	180	*n/a*	
Pomeroy	72	---	X
Rolling Hills	1,690	X (10 calls confirmed)	---
State Fair Turbine	*n/a*		
Victory	28	---	X
Vienna I (combined with Vienna II)	26	---	X
Vienna II	*See Vienna I; facilities combined for assessment and survey*		
Walnut	177	---	X
Wellsburg	4	---	X

Based on the results of the acoustic surveys conducted in 2015, spring and summer presence of northern long-eared bats was confirmed at Lundgren, Macksburg, and Rolling Hills; the 2015 surveys indicated probable absence of northern long-eared bats at the other 15 facilities surveyed. Northern long-eared bats were also captured at Macksburg during mist-netting during the fall 2015 northern long-eared bat

migration study. These captures included female, male, adult, and juvenile bats, indicating the presence of maternity colonies.

At Lundgren, Macksburg, and Rolling Hills, calls of northern long-eared bats were recorded at multiple stations, in several cases more than 3.0 miles apart, indicating widespread distribution of northern long-eared bats within the three facility areas. Using the 1,000-acre colony size applied in the Biological Opinion (BO) prepared for the final 4(d) rule (USFWS 2016d) and rounding forested acres to the next thousandth, it is estimated that a minimum of five separate northern long-eared bat summer roost sites may be found within or nearby these three facilities (one at Lundgren, two at Macksburg, and two at Rolling Hills; WEST 2016a). With an average of 45 females per colony (USFWS 2016d), this suggests a population of 225 female bats. (WEST 2016a). Carrying the estimation further, and assuming a 1:1 female to male ratio (USFWS 2016d), the total estimated population of northern long-eared bats in the surveyed areas would be 450 individuals (WEST 2016a).

Post-construction fatality monitoring conducted between December 1, 2014, and November 13, 2015, at nine of the covered projects documented 907 bat fatalities composed of seven bat species, none of which were northern long-eared bats (Bay et al. 2016a). Post-construction fatality monitoring conducted between November 16, 2015, and November 16, 2016, at 13 of the covered projects documented 2,305 bat fatalities, none of which were northern long-eared bats (Bay et al. 2017a). Post-construction fatality monitoring conducted between March 16, 2017, and March 15, 2018, at 2 of the covered projects documented 577 bat fatalities, none of which were northern long-eared bats (Baumgartner et al. 2018a).

3.4.2.2.2.5 Critical Habitat

There is no designated critical habitat for this species at this time, as the Service determined that designation of critical habitat is not prudent for the northern long-eared bat (81 FR 24707-24714).

3.4.2.2.3 Birds

There are seven state-endangered bird species, two state-threatened bird species, and four special concern bird species in Iowa. The bald eagle is also protected under the BGEPA and is described in detail in Section 3.4.2.1; the Interior least tern is also federally-endangered and the piping plover is also federally-threatened. The range of the piping plover and least tern in Iowa is limited to the Missouri River, and neither species were observed during avian use surveys nor post-construction monitoring at any of MEC's covered projects (WEST 2016c; Bay et al. 2016a, 2017a, 2017b; Baumgartner et al. 2018a).

Of the 13 state-listed and special concern bird species, 3 species (bald eagle, short-eared owl, and long-eared owl) have been found as fatalities at MEC's covered projects. The bald eagle fatalities are described in detail in Section 3.4.2.1.1.4. A total of three short-eared owl fatalities have been found at two facilities, one at Eclipse (found on December 3, 2014) and two at Vienna I (found on November 16, 2015, and on January 5, 2016). A total of two long-eared owls have been found, both at Lundgren (one on April 13, 2015, and one on March 16, 2016). A comprehensive list of state-listed endangered, threatened and special concern bird species in Iowa can be found in the Iowa Wildlife Action Plan (IDNR 2015).

Avian use surveys were conducted at 18 of the covered projects between December 2015 and February 2016 (WEST 2016c). The only state-listed or special concern species observed (excluding federally-listed species and the bald eagle) were the peregrine falcon (observed at Macksburg and Rolling Hills) and the northern harrier (observed at all facilities except for Laurel and Victory).

3.4.2.3 Additional Covered Species

3.4.2.3.1 Little Brown Bat

3.4.2.3.1.1 Status and Distribution

The little brown bat is not a federally-listed, proposed, or candidate species, but it is currently under a Discretionary Status Review on the National Listing Workplan. The Service anticipates determining if a protective status should be designated in 2023 (USFWS 2016a). Currently, no Federal critical habitat, conservation plans, or recovery plans exist for this species. In addition, the little brown bat is not state-listed in Iowa. The little brown bat ranges from the edge of the Coastal Plain north to Alaska. Until the arrival of WNS, little brown bats were an abundant bat species throughout most of their range. The most recent and robust estimate of little brown bat population size comes from Russell et al (2015), which estimates a pre-WNS population size of 8 million bats east of the 100th meridian.

3.4.2.3.1.1 Habitat Characteristics and Use

Little brown bats hibernate in caves and mines in winter. During summer, most females form maternity colonies that often are in anthropogenic structures, such as buildings, bat boxes, and expansion cracks on bridges (Humphrey and Cope 1976; Kunz et al. 1998). Some maternity colonies occur in large dead trees where the bats make extensive use of cracks, crevices, and under exfoliating bark. The diet of little brown bats is dominated by true flies, moths, and beetles, which are often captured by foraging above wetlands, waterways, and along the edges of agricultural fields.

3.4.2.3.1.2 Population Status and Threats

Threats to the little brown bat are similar to the Indiana and northern long-eared bat, with additional impacts associated with the removal of roosts in buildings. Populations often decline from abundant to near extinction within five years of the arrival of WNS (Turner et al. 2011). Once the disease has moved through an area, even limited take has the potential for population-level effects.

3.4.2.3.1.3 Occurrence in Iowa

Little brown bats are found statewide in Iowa. Seventeen caves within seven counties in Iowa were found to have between 1 and 34 little brown bats hibernating during individual hibernacula census counts conducted between 1998 and 2008 (Dixon 2010). Russell et al (2015) estimates that 84 of the 99 counties in Iowa contains between 1 and 5,000 little brown bats, which suggests a population size of up to 420,000. Alternatively, the MEC HCP states that 294,603 little brown bats is considered to be a reasonable coarse estimate of the population in Iowa based on the best available scientific information.

All of the covered MEC projects fall within the range of the little brown bat. Mist-net surveys in and near Macksburg in 2015 (see Section 3.3.2.1) captured three little brown bats (3.9% of the total captures; WEST 2016b). No telemetry was conducted with little brown bats; thus, no roosts were identified.

Acoustic presence/absence surveys conducted for Indiana and northern long-eared bats detected potential little brown bat calls at 13 facilities, and post-construction monitoring has detected 73 little brown bat fatalities at 10 facilities (Table 3.4-4). Overall, little brown bats comprised 1.9% of all bat fatalities.

Table 3.4-4. Calls identified (marked with an X) by automated identification programs as little brown bats during presence/absence surveys for Indiana and northern long-eared bats (during the summer maternity season) at covered MEC projects in Iowa (MEC 2015; WEST 2016a). Calls were not qualitatively identified for little brown bats.

Facility	Little Brown Bat Calls Detected	Little Brown Bat Fatalities (percent composition of all bat fatalities)
Adair	--	0 (0.0%)
Adams	*n/a*	0 (0.0%)
Carroll	X	0 (0.0%)
Century	X	1 (0.5%)
Charles City	X	13 (13.0%)
Eclipse	X	0 (0.0%)
Highland	X	1 (0.3%)
Ida Grove	*n/a*	0 (0.0%)
Intrepid	X	0 (0.0%)
Laurel	X	1 (1.0%)
Lundgren	X	30 (5.5%)
Macksburg	X	14 (4.1%)
Morning Light	*See Adair; facilities combined survey*	0 (0.0%)
O'Brien	*n/a*	0 (0.0%)
Pomeroy	X	0 (0.0%)
Rolling Hills	X	1 (0.3%)
State Fair Turbine	*n/a*	*Not surveyed by WEST*
Victory	X	0 (0.0%)
Vienna I	X	3 (2.4%)
Vienna II	*See Vienna I; facilities combined survey*	2 (3.8%)
Walnut	--	0 (0.0%)
Wellsburg	--	7 (4.1%)

3.4.2.3.2 Tri-colored bat

3.4.2.3.2.1 Status and Distribution

The tri-colored bat is not a federally-listed, proposed, or candidate species, but it is currently under a status review after having been petitioned for listing as a threatened or endangered species under the ESA (Center for Biological Diversity [CBD] and Defenders of Wildlife [DW] 2016). The petition also requests a concurrent designation of critical habitat (CBD and DW 2016). Currently, no Federal critical habitat, conservation plans, or recovery plans exist for this species. In addition, the tri-colored bat is not state-listed in Iowa.

The tri-colored bat ranges throughout most of the eastern United States, a narrow area of southeast Canada, and northern Central America. Though their broad range is not well defined, it appears to expand into the Great Lakes region and westward (Kurta et al. 2007).

3.4.2.3.2.2 Habitat Characteristics and Use

Tri-colored bats hibernate in small caves in winter. During summer, most females form maternity colonies in older forest and occasionally in anthropogenic structures such as old barns. Tri-colored bats are insectivores and forage on true flies, moths, and beetles, which are often captured by foraging above wetlands, waterways, and along the edges of agricultural fields.

3.4.2.3.2.3 Population Status and Threats

Threats to the tri-colored bat are similar to the Indiana and northern long-eared bat, with additional impacts associated with the removal of roosts in buildings. Populations often decline from abundant to near extinction within five years of the arrival of WNS (Turner et al. 2011). Once the disease has moved through an area, even limited take has the potential for population-level effects.

3.4.2.3.2.4 Occurrence in the Plan Area

Tri-colored bats are found statewide in Iowa. There are records of tri-colored bats in 29 hibernacula within 7 counties in Iowa during census counts between 2008 and 2011 (Dixon 2010). Numbers of tri-colored bats using the hibernacula during a given census count range from 1 to 100 bats (Dixon 2010).

All of the covered MEC projects fall within the range of the tri-colored bat. Mist-net surveys in and near Macksburg in 2015 (see Section 3.3.2.1.1) did not capture any tri-colored bats.

Acoustic presence/absence surveys conducted for Indiana and northern long-eared bats detected potential tri-colored bat calls at 11 facilities, and post-construction monitoring has recorded 45 tri-colored bat fatalities at 14 facilities (Table 3.4-5). Overall, tri-colored bats comprised 1.4% of all bat fatalities.

Table 3.4-5. Calls identified (marked with an X) by automated identification programs as tri-colored bats during presence/absence surveys for Indiana and northern long-eared bats (during the summer maternity season) at covered MEC projects in Iowa (MEC 2015; WEST 2016a). Calls were not qualitatively identified for tri-colored bats.

Facility	Tri-colored Bat Calls Detected	Tri-colored Bat Fatalities (percent composition of all bat fatalities)
Adair	--	0 (0.0%)
Adams	*n/a*	4 (2.1%)
Carroll	X	0 (0.0%)
Century	--	2 (1.1%)
Charles City	X	0 (0.0%)
Eclipse	X	1 (1.4%)
Highland	X	7 (1.9%)
Ida Grove	*Not surveyed by WEST*	0 (0.0%)
Intrepid	X	0 (0.0%)
Laurel	X	0 (0.0%)
Lundgren	X	9 (1.7%)
Macksburg	X	10 (2.9%)
Morning Light	*See Adair; facilities combined survey*	1 (2.0%)
O'Brien	*n/a*	1 (1.2%)
Pomeroy	X	1 (0.8%)
Rolling Hills	X	7 (1.8%)
State Fair Turbine	*n/a*	*n/a*
Victory	X	0 (0.0%)
Vienna I	--	1 (0.8%)
Vienna II	*See Vienna I; facilities combined survey*	1 (1.9%)
Walnut	--	0 (0.0%)
Wellsburg	--	1 (0.6%)

3.5 AIR QUALITY AND CLIMATE

3.5.1 Scope of Analysis

This section describes the existing air quality and climate conditions in Iowa. This section includes air quality standards, temperature and precipitation patterns, and extreme weather. The air quality and climate analysis in this EIS is based on information publicly available in online databases and/or documents produced by the following federal and state agencies: United States Environmental Protection Agency (USEPA), IDNR, National Oceanic and Atmospheric Administration (NOAA), and United States

Energy Information Administration (USEIA). The analysis area for air quality and climate is the entire state of Iowa.

3.5.2 Existing Conditions

3.5.2.1 Air Quality

Air quality is generally influenced by the quantities of pollutants released within and upwind of an area, and it can be highly dependent upon the chemical and physical properties of the pollutants. Air quality standards and regulations limit the allowable quantities of pollutants that may be emitted. Additionally, the topography, weather, and land use in an area also affect how pollutants are transported and dispersed and the resulting ambient concentrations.

Air quality standards are important for protection of the public and environment from harmful pollutants. There are two sets of standards in regard to air quality: primary standards involve public health protection, and secondary standards involve public welfare protection, including protection against decreased visibility and damage to animals, plants, and buildings.

Iowa air quality regulations are primarily based on regulations developed by the USEPA to comply with the Clean Air Act (CAA) requirements. Iowa air quality regulations are found in the Environmental Protection Commission section 567 (Chapters 20-34) of the Iowa Administrative Code. IDNR's Air Quality Bureau within the Environmental Protection Division is responsible for meeting National Ambient Air Quality Standards (NAAQS) established by the USEPA and implementing air quality rules and regulations.

Air quality monitoring stations are set up throughout Iowa to measure air quality based on levels of six criteria air pollutants, including: ozone (O_3), carbon monoxide (CO), lead (Pb), nitrogen oxides (NO), particulate matter (PM), which is broken up into PM with a diameter less than 10 microns (PM_{10}) and PM with a diameter less than 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2).

Gaseous pollutant monitors (ozone, carbon monoxide, nitrogen oxide, and sulfur dioxide) are operated 24 hours a day, seven days a week, and provide hourly values. Most ozone monitors operate only during the time of year when ozone values are highest, typically from April through October, though one ozone monitor in Davenport, Iowa, operates year-round to establish ozone trends in cooler temperatures. Particulate filter samplers run for 24-hour periods and collect one filter per day, and most filter-based monitors run at a frequency of one sample every three days, though some are run at higher frequencies if they are located in highly populated areas, near pollution sources, or if pollutant levels are close to the health standards.

In 2016, there were seven NAAQS exceedances in the state of Iowa (IDNR 2016b):

- 4 exceedances associated with the 8-hour ozone standard
- 2 exceedances associated with the 24-hour $PM_{2.5}$ standard
- 1 exceedance of the 1-hour sulfur dioxide standard

3.5.2.2 Climate

According to NOAA (2017), Iowa's climate is characterized by noticeable seasonal variation due to its latitude and interior continental location, with the following characteristics:

- Temperature: ranges from an average of 45°F in the north to 52°F in the southeast, with the highest temperatures in July (average high of 82-87°F) and the lowest temperatures in January (average low of 4-15°F).

- Precipitation (rain): averages around 34 inches per year, ranging from 26 inches in the northwest to 38 inches in the southeast, though it has varied as much as 12.11 to 74.50 inches.

- Snowfall (snowfall): averages 32 inches per year, ranging from 40 inches in the northeast to 20 inches in the southeast, typically occurring from late October to mid-April. The average number of days per season with snow cover of one inch or more varies from 40 days near the Missouri border to 85 days near the Minnesota border.

- Thunderstorms: 45 to 65 thunderstorms per year, with about 85% occurring between April and September, peaking in June. Approximately 46 tornadoes per year over 16 days, peaking in May and June. Hail occurs approximately 2 to 4 days per year at any one location.

- Flooding: most frequent in June, though also occurs mid-March through early April.

- Drought: occurs periodically, usually characterized by deficient rainfall combined with high summer temperatures.

- Winds: average 11.5 mph at 32.8 ft above ground level, highest average wind speeds occur in March and April, and minimum occur in July and August.

- Sunshine: increases from northeast to southwest, varying from 45% in December to 72% in July.

- Growing Season: the time between the last spring frost and the first autumn frost lasts an average of 162 days in central Iowa (April 26 to October 5) and is about 15 days shorter near the Minnesota border and 20 days longer in the southeast.

3.5.2.3 Climate Change and Greenhouse Gases

According to the USEPA (2000), climate change refers to the long-term fluctuations in temperature, precipitation, wind, and other climate elements. This change can occur due to natural processes (e.g., solar-irradiance variations, volcanic activities) and can also be influenced by changes in concentrations of various gases (i.e., greenhouse gases) in the atmosphere, which affect the absorption of radiation. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable

time periods." According to the USEPA (2000), scientists know that increasing greenhouse gas concentrations are warming the planet, and rising temperatures may, in turn, produce changes in precipitation patterns, storm severity, sea level, and acidity, commonly referred to as "climate change."

Greenhouse gases are gases that warm the earth's atmosphere by absorbing solar radiation reflected from the earth's surface. The most common greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). According to the USEPA (2017), human activities are responsible for almost all of the increased greenhouse gases in the atmosphere over the last 150 years, and the largest sources of greenhouse gas emissions in the United States are from:

- Electricity production (29% of 2015 emissions)
- Transportation (27%)
- Industry (21%)
- Commercial and Residential (12%)
- Agriculture (9%)

Land use and forestry offset 11.8% of the 2015 greenhouse gas emissions by acting as a sink, absorbing carbon dioxide from the atmosphere (USEPA 2017). The electricity sector emitted 29% of greenhouse gas emissions in 2015, and coal combustion accounted for 70% of this, while only generating 34% of the electricity (USEPA 2017). Greenhouse gas emissions from electricity generation has increased by approximately 4% since 1990 due to a growing electricity demand and reliance on fossil fuels (USEPA 2017).

Most of the energy in the United States is generated using fossil fuels, including natural gas (34% of electricity generation in 2016) and coal (30% of electricity generation in 2016; USEIA 2017a). Iowa relies heavily upon coal for its electrical generation. Though it has decreased from 76% in 2008 to 47% in 2016, it is still the state's largest source of net electricity generation (USEIA 2017b). In 2016, there were 6,974 MW of installed wind capacity in Iowa (AWEA 2016), and wind provided 36.6% of Iowa's total energy generation for the year, a larger share than any other state, making wind second only to coal as an energy source for energy generation in the state (USEIA 2017b). Nationwide, wind energy accounted for 6% of energy generation (USEIA 2017a).

Additionally, MEC's stated purpose and need in the HCP is to maximize its non-carbon emitting energy production, in support of the company's 100% renewables vision. In 2017, MEC's carbon emissions were approximately 980 pounds of carbon dioxide per megawatt hour-net, which is an approximate 49% reduction in carbon intensity from 2002, prior to the first MEC wind project.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

4.1 OVERVIEW OF ENVIRONMENTAL CONSEQUENCES

This Chapter describes the environmental effects of each of the seven alternatives in Chapter 2 that were retained for detailed analysis and are summarized in Table 4.1-1 below. This chapter is organized by resource as in Chapter 3. All alternatives include the operations of the 22 covered projects and varying levels of mitigation for the covered species. In order to avoid redundancy and streamline this chapter, within each resource section, the environmental effects of each alternative are discussed by effect type (either operations or mitigation effects). The alternatives differ from each other with respect to operational adjustments and the amount of bat mitigation that would be implemented. The alternatives are summarized in Table 4.1-1.

Table 4.1-1. Summary of alternatives.

<table>
<tr><th rowspan="2">Alternative</th><th rowspan="2">Turbine Group</th><th colspan="4">Cut-in Speeds[1]</th><th rowspan="2">HCP, ITP, and Mitigation</th></tr>
<tr><th>March 15 - July 14</th><th>July 15 – September 30</th><th>October 1 – October 16</th><th>October 16 - November 15</th></tr>
<tr><td rowspan="3">No Action Alternative</td><td>Turbines outside the range of the Indiana bat</td><td colspan="4">Manufacturer’s</td><td rowspan="3">No</td></tr>
<tr><td>Turbines >1,000 ft from suitable habitat within the range of the Indiana bat[2]</td><td>Manufacturer’s</td><td colspan="2">6.9 m/s</td><td>Manufacturer’s</td></tr>
<tr><td>Turbines < 1,000 ft from habitat within the range of the Indiana bat</td><td colspan="4">6.9 m/s</td></tr>
<tr><td>A</td><td>Fleet-wide (all 2,021 turbines)</td><td colspan="4">5.0 m/s</td><td>Yes</td></tr>
<tr><td>B</td><td>Turbines > 1,000 ft from suitable habitat</td><td>Manufacturer’s</td><td colspan="2">5.0 m/s</td><td>Manufacturer’s</td><td>Yes</td></tr>
</table>

<table>
<tr><th rowspan="2">Alternative</th><th rowspan="2">Turbine Group</th><th colspan="4">Cut-in Speeds[1]</th><th rowspan="2">HCP, ITP, and Mitigation</th></tr>
<tr><th>March 15 - July 14</th><th>July 15 – September 30</th><th>October 1 – October 16</th><th>October 16 - November 15</th></tr>
<tr><td></td><td>Turbines < 1,000 ft from suitable habitat</td><td colspan="4">5.0 m/s</td><td></td></tr>
<tr><td>C</td><td>Fleet-wide (all 2,021 turbines)</td><td>Manufacturer’s</td><td colspan="2">5.0 m/s</td><td>Manufacturer’s</td><td>Yes</td></tr>
<tr><td>D</td><td>Fleet-wide (all 2,021 turbines)</td><td colspan="4">Manufacturer’s</td><td>Yes</td></tr>
<tr><td>E</td><td>Fleet-wide (all 2,021 turbines)</td><td colspan="4">6.0 m/s</td><td>Yes</td></tr>
<tr><td rowspan="2">HCP Alternative</td><td>Fleet-wide (all 2,021 turbines except for turbines at Lundgren, Macksburg, Wellsburg and Charles City)</td><td colspan="4">Manufacturer’s</td><td rowspan="2">Yes</td></tr>
<tr><td>Turbines at Lundgren, Macksburg, Wellsburg and Charles City</td><td>Manufacturer’s</td><td>5.0 m/s[3]</td><td colspan="2">Manufacturer’s</td></tr>
<tr><td>No Operational Adjustment[4]</td><td>Fleet-wide (all 2,021 turbines)</td><td colspan="4">None</td><td>n/a</td></tr>
</table>

[1] Manufacturer’s cut-in speeds vary by project, see Table 1.2-1 for details.
[2] Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse.
[3] When temperatures are above 50ºF.
[4] Not an Alternative under consideration but included as a baseline for the comparison of environmental consequences for impacts to birds and bats, including rare, threatened, endangered, and covered species.

Throughout this chapter of the FEIS, the MEC BMPs are included in our analysis of environmental consequences. Because MEC has historically implemented these BMPs, and some are required by state or federal law or local ordinance, it is assumed that MEC will continue to implement these BMPs for the life of each project regardless of alternative.

4.2 WILDLIFE RESOURCES

The following MEC project design standards and BMPs outlined in the MEC BBCS relate to wildlife and are implemented at all 22 covered MEC projects. These BMPs represent the baseline conservation measures for wildlife currently being implemented by MEC, as described in their BBCS. While most of the measures listed below are voluntary, the Service believes it is reasonable to assume that the implementation of these measures will be ongoing because MEC has committed to them through the preparation and sharing of the BBCS in coordination with the Service. MEC has also coordinated the development of the personnel training and wildlife protocols with the Service. The level of effort involved in development and the level of public scrutiny indicates a high probability that MEC will continue to implement the BMPs. Should the voluntary BMPs not be implemented, it is possible that an increase in wildlife fatality rates may occur. More specifically, differences in lighting may attract additional night-migrating birds to turbines, increasing the potential for strikes and changes to vehicle BMPs may increase disturbance and roadkill, possibly creating attractants for scavenging birds within the project areas. The Service does not have enough information to meaningfully quantify this potential increase at this time.

- The minimal level of lighting acceptable to the Federal Aviation Administration (FAA) will be used on wind turbines. Steady burning lights will be avoided. Wind turbine lighting will employ only red or dual red and white strobe, strobe-like, or flashing lights. Aviation hazard lighting will be minimized to that which is required by the FAA. The FAA typically requires every structure taller than 200 ft above ground level to be lit to improve visibility to aviation traffic. In the case of wind power developments, the FAA allows a strategic lighting plan that provides complete conspicuity to aviators but does not require lighting every turbine. MEC's lighting plan uses the minimal level of lighting acceptable to the FAA and employs medium-intensity red synchronously flashing lights for nighttime use and for daytime use, if needed, as recommended by the FAA and in the USFWS Land-Based Wind Energy Guidelines (LWEG; USFWS 2012a).

- Existing roads and previously disturbed lands will be used where feasible and in coordination with the landowner to minimize damage to the land surface and to reduce impacts to vegetation associated with creating new roads within the project area.

- Vehicle traffic will be limited to designated project roads unless required due to emergencies or other extenuating circumstances. Reasonable driving speed limits have been established for operations and maintenance (O&M) personnel within the project sites as a safety measure and to minimize potential for road-killed wildlife or livestock that could attract foraging raptors, including eagles. MEC's policy for maintenance personnel requires vehicles traveling on Project access roads to travel at no more than approximately 15 miles per hour.

- All personnel involved with the regular operation of MEC wind energy facilities (either MEC staff or contractors) complete an annual environmental awareness training program. A component of this training specifically includes operational practices to be implemented to avoid and

minimize impacts to wildlife, as well as appropriate responses if dead or injured wildlife are encountered during the course of facility operations.

- O&M personnel are trained to identify, report, and address dead or injured wildlife found within the project sites. A wildlife incident report form is completed to track injuries and mortalities. The form includes the location of carcass discovery and the type of wildlife involved. MEC's environmental compliance specialist is responsible for reporting incidents involving federal or state endangered or threatened species or eagles to the USFWS in accordance with approved protocols. Through agency coordination, MEC's environmental specialist will see to the appropriate disposition of carcasses or, when necessary, transfer injured birds/bats to a wildlife rehabilitation program.

- When livestock and big game carcasses are found near any wind turbine, MEC will work in collaboration with landowners to take necessary steps to promptly remove the carcass and minimize the potential to attract foraging raptors. MEC will work with landowners to minimize the presence of livestock carcasses near turbines.

- Garbage or debris is removed promptly to avoid attracting birds and bats. Areas around turbines are not used for storage of equipment or parts, as these items may be used by prey species (e.g., rabbits) as cover, which may ultimately attract raptors or other predators.

- In the absence of other suitable nest sites, raptors and other birds may use collector/transmission line structures, MET towers, and substation equipment for nesting. In some cases, bird nests can cause operational problems such as power outages. O&M personnel are instructed to promptly inform MEC's environmental compliance specialist when a nest is observed on or near project facilities. O&M personnel will not remove or modify a nest unless directed to do so by MEC's environmental compliance specialist and in coordination with the USFWS.

- MEC keeps lighting at turbines, O&M buildings, and project substations to a minimum to safely and securely operate its facilities, consistent with facility security requirements. O&M personnel are directed to extinguish nighttime exterior lights at O&M buildings and substations (consistent with facility security requirements) when not in use, and O&M personnel are briefed on the importance of minimizing nighttime light use. Over the course of maintaining and updating existing facilities, MEC will replace/remove high intensity lighting, steady-burning, or bright lights such as sodium vapor, quartz, halogen, or other bright spotlights. It is anticipated that high intensity lighting will be replaced as existing lights reach the end of their service life and fail. New exterior lights will be hooded downward and directed to minimize horizontal and skyward illumination, and, whenever possible, lights with motion or heat sensors and switches will be used to keep lights off when not required.

4.2.1 Impact Criteria

Most regulations associated with wildlife impacts are concerned with effects to rare, threatened, and endangered species, which are discussed in Section 4.3, along with eagles which are protected under BGEPA. In addition, the MBTA protects non-listed, migratory birds.

Significant impacts to wildlife resources are those that substantially affect a species' population (locally, regionally, or range-wide) or significantly reduce its habitat quality or quantity. Impacts to species can be both direct and indirect. Disturbance, injury, mortality, and habitat alteration are examples of direct effects. Examples of indirect effects include habitat loss or degradation over time or in another place in association with another impacted resource, such as surface water or groundwater alterations, modification or creation of habitat edges and openings that favor a different mix of species, and changes in plant species composition. Animal displacement or avoidance due to changed or increased traffic patterns can also be termed indirect or secondary effects.

The analysis in this section considers impacts on two categories of wildlife:

1. Bats not listed under the ESA or covered by the HCP
2. Birds, particularly BCC species

The analysis considers the project's potential to affect species distribution and life history with respect to an effect's intensity, duration, and frequency. BMPs and mitigation measures to minimize and reduce impacts are incorporated into the following evaluation of potential effects.

Several comments related to non-listed wildlife were received during the scoping period (see Section 1.4.1), including:

- Several landowners commented that they do not believe there are any bird or bat issues, or that issues are minimal;
- Fatality estimates should be adjusted for sources of bias;
- Indirect effects to bats should be considered, including habitat fragmentation;
- Analyze the timing of bat fatalities, especially with regards to reproductive potential;
- Tree removal should occur outside of the bat active season, and impacts to bat habitat should be analyzed;
- Analysis of flyways and foraging areas should be included, including adaptive management; and
- Analysis should include the entire species' range, extending beyond Iowa.

4.2.2 Bats Not Listed Under the ESA or Covered by the HCP

4.2.2.1 Operations Effects

Operating commercial wind facilities have been found to affect many bat species (Arnett et al. 2008). These impacts may include the displacement of individuals, fragmentation of habitat, and direct mortality from turbine interaction (Kunz et al. 2007a).

4.2.2.1.1 Disturbance/Displacement

Limited information is available regarding the disturbance/displacement of bats at wind facilities (Kunz et al. 2007a). However, based on the number and frequency of documented deaths of bat species observed at wind energy facilities throughout North America, there appears to be no active avoidance of wind facilities by bat species (USFWS 2011). Indeed, some researchers have suggested that migratory tree bats (i.e., hoary bats, eastern red bats, and silver-haired bats) may be attracted to wind turbines because of their migratory and mating behavior patterns (Kunz et al. 2007b; Cryan 2008). At dawn, these tree bats may mistake wind turbines for roost trees, thereby increasing the risk of mortality (Kunz et al. 2007b). Cryan (2008) suggested that male tree bats may be using tall trees as lekking sites, calling from these sites to passing females. If this is the case, tree bats may be more attracted to wind turbine sites after the turbines are erected.

Additionally, migrating tree bats are thought to navigate across large landscapes using vision rather than echolocation, possibly resulting in the bats being attracted to visual landscape features, such as wind turbines (Cryan and Brown 2007). Migrating bats may also fly higher to maximize efficiency. As further support for these hypotheses, the majority of bat fatalities occur mid-summer through fall, approximately the same time frame as southward migration of tree bats (Arnett et al. 2008). For these reasons, bats are not expected to be disturbed or displaced from the 22 covered projects as a result of operations. The possible displacement impacts on bats from noise, vibration, and/or increased human activity and traffic associated with maintenance activities would be similar in character as those for repowering activities, but they would occur intermittently and over shorter periods of time.

It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement for non-listed and non-covered bats in the vicinity of any facility over existing conditions, as all 22 covered projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with maintenance activities.

4.2.2.1.2 Fatality

Whether bats are attracted to turbines and the exact mechanisms by which turbines cause mortality are unclear (reviewed in Kunz et al. 2007b). Recently, researchers have hypothesized and tested various elements potentially connected to bat-turbine interactions. These elements include the role of land cover and environmental conditions in attracting bats to turbine sites, behavioral factors that might make turbines attractive to bats, pressure changes from rotating blades causing "barotrauma,"[16] or direct impact of unsuspecting migrant bats (Kerns et al. 2005; Kunz et al. 2007b; Baerwald et al. 2008; Horn et al. 2008). Determining the effects of wind farms on bats is of critical importance to the future conservation of these poorly understood mammals.

[16] Rollins et al. (2012) evaluated competing hypotheses of barotrauma and traumatic injury to determine the cause of mortality at wind projects and found a small fraction (6%, 5 of 81) of bats with lesions possibly consistent with barotrauma. Based on forensic pathology examination, the data suggest traumatic injury is the major cause of bat mortality at wind farms, and barotrauma is a minor cause.

Based on data from post-construction fatality surveys (see Section 3.3.2.1.2), the bat fatality rate[17] at MEC's covered projects ranges from 9.38 to 171.44 bats per turbine[18] per year, with an average of 31.01 bats per turbine per year. Using the site-specific estimates where available (see Table 3.3-1; projects with more than one year of data were averaged across the years) and the average values from all projects for projects without site-specific results, an estimated 57,473 bats would be killed each year at MEC's covered projects if no operational adjustments were made (Table 4.2-1).

Table 4.2-1. Estimated bat fatalities per turbine by project under no operational adjustments (not an alternative under consideration but included as a baseline). See Section 3.3.2.2.2 for details on the studies.

Facility	Total Number of Turbines	Turbines within 1,000 ft of Suitable Habitat	Average Fatalities per Turbine
Adair	76	2	32.32
Adams	65	1	22.69
Carroll	100	3	17.56
Century	145	0	13.61
Charles City	50	2	15.62
Eclipse	87	10	23.03
Highland	214	1	20.24
Ida Grove	134	0	69.4
Intrepid	122	0	27.55
Laurel	52	3	32.71
Lundgren	107	1	44.03
Macksburg	51	40	98.38
Morning Light	44	0	46.45
O'Brien	104	0	47.47
Pomeroy	184	2	9.38
Rolling Hills	193	79	14.29
State Fair Turbine	1	0	31.01
Victory	66	0	9.72
Vienna I	45	0	21.32
Vienna II	19	0	24.11
Walnut	102	7	32.54
Wellsburg	60	0	28.87
Total	2,021	150	*n/a*

[17] These values include threatened, endangered, and other covered bat species, which are discussed in detail in Section 4.3.
[18] Per turbine estimates were used based on data from Johnson et al. 2016 which indicated that capacity (i.e., MW) may not be an accurate predictor, as a turbine with double the capacity does not have double the rotor-swept area, and, furthermore, the rotor-swept area is not a good indicator as larger areas result in a smaller fraction of the area occupied by the blades at any given moment. For this reason, it is assumed that repowered turbines will have the same fatality rates as they did prior to repowering.

Based upon the timing of bat fatalities found in 2015 and 2016, the following distribution is used for the analysis of the seven alternatives:

- 13.8% of fatalities occur between March 15 and July 14
- 82.7% of fatalities occur between July 15 and September 30
- 2.9% of fatalities occur between October 1 and October 15
- 0.6% of fatalities occur between October 16 and November 15

Based upon the species composition of bat fatalities, the following distribution is used for the analysis of the seven alternatives (does not add up to 100% because covered species are not included):

- 38.6% eastern red bats
- 32.4% hoary bats
- 14.0% big brown bats
- 9.4% silver-haired bats
- 2.5% evening bats

While not an alternative under consideration, the no operational adjustment scenario is estimated to result in 57,473 bat fatalities per year. Of these, an estimated 96.9% or 55,691 would be non-listed and non-covered bat species. For comparison, we estimate the following impacts on non-listed and non-covered bat species under the no operational adjustment scenario:

- 22,185 eastern red bats per year, or 665,550 over 30 years
- 18,621 hoary bats, or 558,630 over 30 years
- 8,046 big brown bats, or 241,380 over 30 years
- 5,402 silver-haired bats, or 162,060 over 30 years
- 1,437 evening bats, or 43,110 over 30 years

4.2.2.1.2.1 No Action Alternative

Under the No Action Alternative, all turbines fleet-wide would feather below the manufacturer's cut-in speed during the bat active season (March 15 to November 15; Table 4.1-1). Additionally, projects within the range of the Indiana bat (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) would feather below 6.9 m/s for the entire bat active season (March 15 to November 15) at turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat and at all turbines during the peak bat fatality period (July 15 to October 15). Feathering below the manufacturer's cut-in speed is expected to reduce all bat fatalities by 35%, and feathering below 6.9 m/s is expected to reduce all bat fatalities by 81% (see Table 2.1-2).

Applying these reductions to the annual fatality rates[19] shown for each project in Table 4.2-1 results in an estimated all bat fatality of 31,296 bats, an overall reduction of 47.1% from the estimated 57,473 bats which would be killed under the no operational adjustment scenario. Of these, an estimated 30,325 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under the No Action Alternative:

- 12,090 eastern red bats per year, or 362,400 over the permit-term
- 10,140 hoary bats, or 304,200 over the permit term
- 4,381 big brown bats, or 131,430 over the permit term
- 2,942 silver-haired bats, or 88,260 over the permit term
- 782 evening bats, or 23,460 over the permit term

4.2.2.1.2.2 Alternative A

Under Alternative A, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities by 62% (using the average reduction; Table 2.1-2).

Applying this reduction[20] to the annual fatality rates shown for each project in Table 4.-1 results in an estimated all bat fatality of 21,840 bats. Of these, an estimated 21,163 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under Alternative A:

- 8,430 eastern red bats per year, or 252,900 over the permit-term
- 7,076 hoary bats, or 212,280 over the permit term
- 3,058 big brown bats, or 91,740 over the permit term
- 2,053 silver-haired bats, or 61,590over the permit term
- 546 evening bats, or 16,380 over the permit term

4.2.2.1.2.3 Alternative B

Under Alternative B, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat would operate with a cut-in speed of 5.0 m/s for the entire the bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.3-1) outside of the peak bat fatality period with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These

[19] **No Action Alternative Equation for Facilities within Indiana Bat Range**: Fatalities = ((Fatalities$_{\text{March15-July15}}$ + Fatalities$_{\text{October16-November15}}$) * ((Turbines$_{\text{Total}}$ -Turbines$_{\text{Within1,000ft}}$) / Turbines$_{\text{Total}}$) * 0.65) + ((Fatalities$_{\text{March15-July15}}$ + Fatalities$_{\text{October16-November15}}$) * ((Turbines$_{\text{Within1,000ft}}$/Turbines$_{\text{Total}}$) * 0.19)) + ((Fatalities$_{\text{July15-October15}}$) * 0.19)
No Action Alternative Equation for Facilities Outside of Indiana Bat Range: Fatalities = Fatalities$_{\text{Total}}$ * 0.65

[20] **Alternative A Equation for All Facilities**: Fatalities = Fatalities$_{\text{Total}}$ * 0.38

actions would be expected to reduce all bat fatalities by 62% when operating at 5.0 m/s and by 35% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Applying these reductions[21] to the average annual fatality rates shown for each project in Table 4.2-1 results in an estimated all bat fatality 23,847 bats, an overall reduction of 58.6% from the estimated 57,473 bats which would be killed under the no operational adjustment scenario. Of these, an estimated 23,108 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under Alternative B:

- 9,205 eastern red bats per year, or 276,150 over the permit-term
- 7,726 hoary bats, or 231,780 over the permit term
- 3,339 big brown bats, or 100,170 over the permit term
- 2,242 silver-haired bats, or 67,260 over the permit term
- 596 evening bats, or 17,880 over the permit term

4.2.2.1.2.4 Alternative C

Under Alternative C, the cut-in speed of all turbines fleet-wide would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities by 62% during the peak bat fatality period when operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Applying these reductions[22] to the average annual fatality rates shown for each project in Table 4.2-1 results in an estimated all bat fatality of 24,074 bats, an overall reduction of 58.1% from the estimated 57,473 bats which would be killed under the no operational adjustment scenario. Of these, an estimated 23,328 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under Alternative C:

- 9,293 eastern red bats per year, or 278,790 over the permit-term
- 7,800 hoary bats, or 234,000 over the permit term
- 3,370 big brown bats, or 101,100 over the permit term
- 2,263 silver-haired bats, or 67,890 over the permit term
- 602 evening bats, or 18,060 over the permit term

[21] **Alternative B Equation for All Facilities:** $Fatalities = ((Turbines_{Within\ 1,000ft} / Turbines_{Total}) * Fatalities_{Total} * 0.38) + (((Turbines_{Total} - Turbines_{Within1,000ft}) / Turbines_{Total}) * Fatalities_{July15\text{-}October15} * 0.38) + ((Turbines_{Total} - Turbines_{Within1,000ft}) / Turbines_{Total} * (Fatalities_{March15\text{-}July15} + Fatalities_{October16\text{-}November15}) * 0.65))$

[22] **Alternative C Equation for All Facilities:** $Fatalities = (Fatalities_{March15\text{-}July15} * 0.65) + (Fatalities_{July16\text{-}October15} * 0.38) + (Fatalities_{October16\text{-}November15} * 0.65)$

4.2.2.1.2.5 Alternative D

Under Alternative D, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.3-1) for the entire bat active season (March 15 through November 15; Table 4.1-1). No projects or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities by 35% (Table 2.1-2).

Applying this reduction[23] to the average annual fatality rates shown for each project in Table 4.2-1 results in an estimated all bat fatality of 37,357 bats. Of these, an estimated 36,200 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under Alternative D:

- 14,420 eastern red bats per year, or 432,600 over the permit-term
- 12,104 hoary bats, or 363,120 over the permit term
- 5,230 big brown bats, or 156,900 over the permit term
- 3,512 silver-haired bats, or 105,360 over the permit term
- 934 evening bats, or 28,020 over the permit term

4.2.2.1.2.6 Alternative E

Under Alternative E, all turbines fleet-wide would operate with a cut-in speed of 6.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities by 63% (using the average reduction; Table 2.1-2).

Applying this reduction[24] to the annual fatality rates shown for each project in Table 4.-1 results in an estimated all bat fatality of 21,265 bats. Of these, an estimated 20,606 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under Alternative E:

- 8,208 eastern red bats per year, or 246,240 over the permit-term
- 6,890 hoary bats, or 206,700 over the permit term
- 2,977 big brown bats, or 89,310 over the permit term
- 1,999 silver-haired bats, or 59,970 over the permit term
- 532 evening bats, or 15,960 over the permit term

4.2.2.1.2.7 HCP Alternative

Under MEC's HCP Alternative, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15; Table 4.1-1). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30

[23] **Alternative D Equation for All Facilities:** Fatalities = $Fatalities_{Total}$ * 0.65
[24] **Alternative E Equation for All Facilities**: Fatalities = $Fatalities_{Total}$ * 0.37

when temperatures are above 50°F (when 99.0% of bat fatalities are anticipated to occur) at four projects: Macksburg, Lundgren, Charles City, and Wellsburg. These operational protocols would be expected to reduce all bat fatalities by 62% between July 15 and September 30 at the four projects when operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Applying these reductions[25] to the average annual fatality rates shown for each project in Table 4.2-1 results in an estimated all bat fatality of 34,651 bats, an overall reduction of 40.4% from the estimated 57,743 bats which would be killed under the no operational adjustment scenario. Of these, an estimated 33,576 would be non-listed and non-covered bat species. We estimate the following impacts to non-listed and non-covered bat species under the HCP Alternative:

- 13,375 eastern red bats per year, or 401,250 over the permit-term
- 11,227 hoary bats, or 336,810 over the permit term
- 4,851 big brown bats, or 145,530 over the permit term
- 3,257 silver-haired bats, or 97,710 over the permit term
- 866 evening bats, or 25,980 over the permit term

4.2.2.1.3 Summary of Fatality Impacts

All seven Alternatives under consideration result in fewer non-listed and non-covered bat fatalities than the no operational adjustment scenario (Table 4.2-2).

Migratory tree bats have shorter life spans than other bats, and females are capable of producing multiple pups per year, as opposed to the covered species, which tend to produce a single pup each year. As such, these species may be capable of tolerating greater mortality than other species. Frick et al. (2017) explores various scenarios of hoary bat fatality rates in North America under several potential population sizes. The paper demonstrates that the magnitude of the impact of tree bat fatality rates is very dependent upon the population size and growth rates. Recent research has shown that eastern red bat and hoary bat populations both have large, well-connected populations and have not yet started to show genetic evidence of population declines (Korstian et al. 2015). However, population numbers of tree bats are currently unknown, and therefore the impact of any of the alternatives on tree bat populations cannot be calculated and may or may not be significant.

[25] **HCP Alternative Equation for Macksburg, Wellsburg, Charles City, and Lundgren**: Fatalities = ((Fatalities$_{\text{March15-July15}}$ + Fatalities$_{\text{October1-November15}}$) * 0.65) + (Fatalities$_{\text{July15-September30}}$ *0.99* 0.38) + (Fatalities$_{\text{July15-September30}}$ *0.01* 0.65)
HCP Alternative Equation for all Other Facilities: Fatalities = Fatalities$_{\text{Total}}$ * 0.65

Table 4.2-2. Summary of estimated annual fatalities of non-listed and non-covered bats by alternative (see Table 4.1-1 for operational details), with 30-year permit term totals in parentheses. The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison.

Species	No Operational Adjustment Scenario	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Eastern Red Bat	22,185 (665,550)	12,080 (362,400)	8,430 (252,900)	9,205 (276,790)	9,293 (278,790)	14,420 (432,600)	8,208 (246,240)	13,375 (401,250)
Hoary Bat	18,621 (558,630)	10,140 (304,200)	7,076 (212,280)	7,726 (231,780)	7,800 (234,000)	12,104 (363,120)	6,890 (206,700)	11,227 (336,810)
Big Brown Bat	8,046 (241,380)	4,381 (131,430)	3,058 (91,740)	3,339 (100,170)	3,370 (101,100)	5,230 (156,900)	2,977 (89,310)	4,851 (145,530)
Silver-haired Bat	5,402 (162,060)	2,942 (88,260)	2,053 (61,590)	2,241 (67,260)	2,263 (67,890)	3,512 (105,360)	1,999 (59,970)	3,257 (97,710)
Evening Bat	1,437 (43,110)	782 (23,460)	546 (16,380)	596 (17,880)	602 (18,060)	934 (28,020)	532 (15,960)	866 (25,980)
Total Non-listed and Non-Covered Bats	55,691 (1,670,730)	30,325 (909,750)	21,163 (634,890)	23,108 (693,240)	23,328 (699,840)	36,200 (1,086,000)	20,606 (618,180)	33,576 (1,007,280)
Percent Reduction in Mortality from No Operational Adjustment Scenario	*n/a*	47.1%	62.0%	58.6%	58.1%	35.0%	63.0%	40.4%

4.2.2.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to non-listed and non-covered bats would occur.

Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) – considered a beneficial effect for the non-listed and non-covered bats as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for the non-listed and non-covered bats as the amount of summer bat habitat would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for non-listed and non-covered bats which roost in structures (e.g., big brown bats and evening bats).

The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative and is summarized in Table 4.2-3.

Table 4.2-3. Mitigation acres and number of preserved structures by alternative.

Alternative	Acres of Habitat Protection/Restoration[1]	Number of Preserved Structures
No Action Alternative	0	0
Alternative A	768 to 1,852	25 to 27
Alternative B	768 to 1,852	28 to 30
Alternative C	768 to 2,075	28 to 30
Alternative D	1,262 to 3,200	42 to 50
Alternative E	768 to 1,852	25 to 28
HCP Alternative	1,309 to 3,200	42 to 50

[1] A range of mitigation is provided for each alternative based on the minimum and maximum amounts of mitigation that would be implemented under each alternative. Under each alternative, the minimum amount of mitigation would occur regardless of actual take levels, and then adaptive management would be used throughout the 30-year permit term to ensure that mitigation stayed ahead of the take, up to the permitted level (maximum amount of mitigation).

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3), and the only bald eagle mitigation activities with the potential to impact non-listed and non-covered bats are those related to land protection and reforestation, which may have a beneficial effect on non-listed and non-covered bats if they utilize the mitigation site, but this impact cannot be quantified at this time as the location and occupancy of mitigation sites is not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.2.3 Birds Not Listed Under the ESA or Protected by BGEPA

4.2.3.1 Operations Effects

Operational impacts to birds, including BCC species, would occur under all seven of the alternatives being analyzed. Impacts on birds are not expected to differ among the seven alternatives because the only technique proven to minimize impacts to birds is turbine shutdown during high-risk periods triggered by real-time field observations and/or automated detectors (Marques et al. 2014). Therefore, for this analysis, it is assumed that feathering turbines would not affect avian resources. Operational impacts of wind facilities on birds include:

- Varying degrees of displacement from the wind turbines and surrounding habitat; and,
- Fatalities resulting from collisions with turbines, transmission lines, and other project-related structures (Winegrad 2004).

These two categories of impacts (disturbance/displacement and fatalities) are each discussed in detail below. The operations and maintenance activities of the seven alternatives under consideration vary only in nighttime operational adjustments (Table 4.1-1). The protocol (cut-in-speed/temperature) in which turbines are operated at night is not known to affect avian use in the vicinity of turbines (Marques et al. 2014). All alternatives include the implementation of MEC's BBCS, which outlines steps taken to minimize impacts to all bird species, including measures to reduce lighting so as not to attract birds (thereby reducing mortality risk during low visibility nights). Therefore, potential impacts from turbine operations are not expected to differ among the seven alternatives.

4.2.3.1.1 Disturbance/Displacement

Displacement and disturbance impacts may include decreased foraging by individuals, decreased nesting attempts, reduced nesting success, or reduced survival of juveniles or adults. Wind turbines may displace birds from an area due to the creation of edge habitat, introduction of vertical structures, and/or disturbances directly associated with turbines (e.g., noise, shadow flicker). Disturbance impacts are often complex, involving shifts in abundance, species composition, and behavioral patterns. The magnitudes of these impacts vary across species, habitats, and regions. Concerns have been raised that displacement from habitat may significantly affect certain avian populations (The Ornithological Council 2007). Although most research to date has focused on collision fatality associated with wind energy facilities, the limited data available indicate that avoidance by individual birds generally extends 246 ft to 2,624 ft from a turbine, depending on the environment and the bird species affected, with general small-scale (less than 330 ft) impacts on birds in the Midwest (Strickland 2004). Studies by Shaffer and Johnson (2008) and Kerlinger (2002) have concluded that, in general, bird species that are more adapted to human disturbances or agricultural or edge habitat (e.g., killdeer) are less likely to exhibit avoidance behavior near turbines than other species.

For the 22 covered projects, the turbines have been constructed and have been in operation for multiple years, and it is likely that the birds inhabiting those areas are adapted to the presence of turbines. It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement of avian species in the vicinity of any facility.

4.2.3.1.2 Fatalities

Wind turbines pose a fatality risk to birds under all seven alternatives. Bird fatalities at wind facilities have been documented during both the breeding and migration seasons; however, data suggest the majority of fatalities at wind energy facilities occur during the spring and fall migration periods (NRC 2007; Johnson et al. 2002).

Passerines (songbirds) have accounted for over 50 percent of avian fatalities at most wind facilities (Erickson et al. 2002). Resident and migrating passerines represent the majority of fatalities at wind turbines nationwide (75%, excluding California; Erickson et al. 2001) and represented the majority of fatalities at the 22 covered MEC projects during standardized post-construction monitoring between 2014 and 2016 (65.1%; see Section 3.3.2.2.). It is likely that birds taking off at dusk, landing at dawn, or birds traveling in low cloud or fog conditions (which lower the flight altitude of most migrants) are at the greatest risk of collision (Kerlinger 1995).

Based on data from post-construction fatality surveys (see Section 3.3.2.2.2), the avian fatality rate at MEC's covered projects ranges from 2.28 to 19.79 birds per turbine[26] per year, with an average of 7.17 birds per turbine per year. Using the site-specific estimates where available (see Table 3.3-5) and the average values for facilities without results, an estimated 12,664 birds would be killed each year at MEC's covered projects (Table 4.2-4).

Table 4.2-4. Estimated avian fatalities by project. See Section 3.3.2.2.2 for details on the studies.

Facility	Turbines	Fatalities per Turbine	Fatalities per Year	Fatalities over Permit Term
Adair	76	10.67	811	24,330
Adams	65	11.09	721	21,630
Carroll	100	5.33	533	15,990
Century	145	5.31	770	23,100
Charles City	50	6.20	310	9,300
Eclipse	87	8.32	724	21,720
Highland	214	5.29	1,132	33,960
Ida Grove	134	3.75	503	15,090
Intrepid	122	4.40	537	16,110
Laurel	52	6.81	354	10,620
Lundgren	107	7.37	789	23,670
Macksburg	51	9.76	498	14,940
Morning Light	44	5.44	239	7,170
O'Brien	104	2.57	267	8,010
Pomeroy	184	4.13	760	22,800
Rolling Hills	193	6.06	1,170	35,100
State Fair Turbine	1	7.17	7	210
Victory	66	2.28	150	4,500
Vienna I	45	13.37	602	18,060

[26] Per turbine estimates were used based on data from Johnson et al. 2016 which indicated that capacity (i.e., MW) may not be an accurate predictor, as a turbine with double the capacity does not have double the rotor-swept area, and, furthermore, the rotor-swept area is not a good indicator as larger areas result in a smaller fraction of the area occupied by the blades at any given moment.

Facility	Turbines	Fatalities per Turbine	Fatalities per Year	Fatalities over Permit Term
Vienna II	19	8.37	159	4,770
Walnut	102	4.32	441	13,230
Wellsburg	60	19.79	1,187	35,610
Total	2,190	*n/a*	12,664	379,920

As described in Section 3.3.2.2.2, the 9 most commonly found bird fatalities are identified in Table 4.2-5, along with the 13 BCC species found. The estimated annual fatalities by species were calculated using the total estimated avian fatality rate of 12,664 birds per year for the 22 covered projects and then projected over the 30-year permit term. Based on these estimates, as well as published global population estimates (Partners in Flight [PIF] 2013; Birdlife International 2016, 2019), the estimated yearly take by species for the 9 most commonly found species ranges from less than 0.01% to 0.06% of the global population size and from less than 0.01% to 1.67% of the global population size over the 30-year permit term. For all BCC species except for the yellow rail, the estimated yearly take is 0.01% or less for all species and less than 0.27% for the 30-year estimates. The yellow rail has an estimated yearly take of less than 0.07%, and less than 2.0% for the 30-year estimate.

Table 4.2-5. Estimated avian fatalities by species for the 9 most commonly found fatalities and the 131 BCC fatalities found (see Section 3.3.2.2.2), based on an annual avian fatality rate of 12,664 birds. BCR population estimates (Prairie Potholes and Eastern Tallgrass Prairie combined) and global population estimates are also provided. Population estimates which are not available are denoted with n/a.

	Species	Percent of Fatalities	Annual Estimate	Permit Term	Population Estimate within BCRs	Global Population Estimate	Source
Nine Most Common Species	**Golden-crowned Kinglet**	6.5%	823	24,690	4,000	100,000,000	PIF 2013
	Ruby-crowned Kinglet	5.1%	646	19,380	17,000	90,000,000	PIF 2013
	Killdeer	4.4%	557	16,710	*n/a*	1,000,000	Birdlife International 2016b
	European Starling	4.1%	519	15,570	11,300,000	150,000,000	PIF 2013
	Turkey Vulture	3.8%	481	14,430	349,000	18,000,000	PIF 2013
	Ring-necked Pheasant	3.4%	519	15,570	5,000,000	50,000,000	PIF 2013

	Species	Percent of Fatalities	Annual Estimate	Permit Term	Population Estimate within BCRs	Global Population Estimate	Source
	Red-tailed Hawk	2.7%	342	10,260	40,000	2,300,000	PIF 2013
	Horned Lark	2.4%	304	9,120	19,300,000	120,000,000	PIF 2013
	Nashbille Warbler	2.4%	604	9,120	7,000	32,000,000	PIF 2013
BCC Species	**Marsh Wren**	1.44%	182	5,460	4,005,000	9,000,000	PIF 2013
	Dickcissel	1.35%	171	5,130	7,900,000	20,000,000	PIF 2013
	Northern Flicker	0.63%	809	2,400	590,000	9,000,000	PIF 2013
	Upland Sandpiper	0.54%	68	2,040	*n/a*	750,000	Andres et al. 2012
	Field Sparrow	0.27%	34	1,020	1,450,000	7,600,000	PIF 2013
	Pied-billed Grebe	0.27%	34	1,020	*n/a*	*n/a*	*n/a*
	Bobolink	0.18%	23	693	3,200,000	8,000,000	PIF 2013
	Acadian Flycatcher	0.18%	23	690	80,000	4,500,000	PIF 2013
	Black-billed Cuckoo	0.18%	23	690	150,000	870,000	PIF 2013
	Brown Thrasher	0.09%	11	330	1,450,000	4,900,000	PIF 2013
	Grasshopper Sparrow	0.09%	11	330	8,500,000	31,000,000	PIF 2013
	Rusty Blackbird	0.09%	11	330	13,000	5,000,000	PIF 2013
	Yellow Rail	0.09%	11	330	*n/a*	17,000	BirdLife International 2019

Given that the take would be spread over 30 years and no species had an estimated annual take of more than 0.07% of the global population estimate, fatalities from MEC's facilities are not anticipated to result in a significant population level impact to any one species at the global scale. At the BCR population level, annual take was less than 0.14% for all species except for the golden-crown kinglet, ruby-crowned kinglet, and Nashville warbler, which had annual take of 20.58%, 3.80%, and 4.34% of the BCR population estimates, respectively, if the annual take were only from the local BCR populations.

Both species of kinglets are migratory species in Iowa and are not known to breed in the state (Kent and Dinsmore 1996; Jackson et al. 1996). Of the 67 golden-crowned kinglets found as fatalities at the 22

covered projects (see Section 3.3.2.2.2), 65 were found during fall migration (found between September 29 and December 4), and 2 were found during spring migration (found between April 5 and May 22), indicating that fatalities are likely from migratory populations rather than resident breeding birds. Likewise, of the 48 ruby-crowned kinglets found as fatalities during post-construction monitoring at the 22 covered projects (see Section 3.3.2.2.2), 29 were found during fall migration (found between September 27 and October 27), and 18 were found during spring migration (found between April 8 and May 21), again indicating that fatalities are likely from migratory populations rather than resident breeding birds. It is assumed that individual ruby-crowned kinglets and golden-crowned kinglets killed at the 22 covered projects during migration are from various breeding and wintering populations, including populations outside of the 2 BCRs, and that the impact on the BCR populations is considerably lower.

The Nashville warbler is also a migratory species in Iowa. Of the 27 Nashville warblers found as fatalities at the covered projects (see Section 3.3.2.2.2), 16 were found during fall migration (September through November), and 8 were found during spring migration (April through May), indicating that fatalities are likely from migratory populations rather than resident breeding birds. It is assumed that individual Nashville warblers killed at the 22 covered projects during migration are from various breeding and wintering populations, including populations outside of the 2 BCRs, and that impact on the BCR populations is considerably lower.

For all species, most avian fatalities occur during migration, such that individuals killed would likely be from various breeding and wintering populations.

4.2.3.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to birds from mitigation actions would occur.

Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) – considered a beneficial effect for forest dwelling birds[27], as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for forest-dwelling birds, as the amount of woodland would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for bird species which roost in or on structures (e.g.., barn swallows, American robins).

The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative and is summarized in Table 4.2-3, but the impacts to non-listed and non-BGEPA covered birds cannot be quantified at this time since the locations and occupancy of mitigation

[27] Table 3.7-5 outlines the habitat preferences for BCC species in Iowa; those that prefer wooded or forested habitats would be the most likely to benefit from mitigation.

sites are not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

Mitigation for bald eagles is the same under all six action alternatives and includes funding a conservation fund, which may be used to purchase land or easements to protect bald eagles, to fund public education initiatives related to toxic substance abatement in the environment, funding rehabilitation of injured bald eagles, implementing education for farmers on proper carcass disposal, or funding reforestation efforts (see MEC HCP Section 5.3.3.2). These activities may have a beneficial impact on other bird species, particularly raptors, but this impact cannot be quantified at this time, as the amount and location of each mitigation type is not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.2.4 Mitigation for Impacts

No specific mitigation is proposed for the general wildlife discussed in this section. However, mitigation proposed for covered species would benefit these species as well.

4.3 RARE, THREATENED, ENDANGERED, AND OTHER COVERED WILDLIFE SPECIES

The MEC project design standards and BMPs related to wildlife resources also apply to rare, threatened, endangered, and other covered wildlife species and are implemented at all 22 covered MEC projects.

4.3.1 Impact Criteria

The ESA and the state of Iowa protect species that are federally- and/or state-listed as threatened or endangered from unauthorized taking. The BGEPA extends these protections to the bald and golden eagle. Taking includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting. Federal agencies must ensure that any authorized federal action is unlikely to jeopardize listed species' continued existence or destroy or adversely modify designated critical habitat (16 U.S.C. 1536).

Impacts to species can be both direct and indirect. Disturbance, injury, mortality, and habitat alteration are examples of direct effects. Examples of indirect effects include habitat loss or degradation over time or in another place in association with another impacted resource, such as surface water or groundwater alterations, modification or creation of habitat edges and openings that favor a different mix of species, and changes in plant species composition. Animal displacement or avoidance due to changed or increased traffic patterns can also be termed indirect or secondary effects.

The analysis in this section considers impacts on four categories of wildlife:

1. Bald and golden eagles (protected by the BGEPA)
2. Federally-listed species (protected by the ESA)

3. State-listed species (protected by Iowa's Endangered Plants and Wildlife Law [EPWL]) and special concern species (not protected)
4. Additional covered species (requested by MEC)

The analysis considers each alternative's potential to affect species distribution and life history with respect to an effect's intensity, duration, and frequency. The significance of impacts is assessed at a local, regional, or rangewide population level, depending upon the species. BMPs and mitigation measures to minimize and reduce impacts are incorporated into the following evaluation of potential effects.

Multiple comments related to rare, threatened, endangered, and other covered species were received during the scoping period (see Section 1.4.1), including the comments for general wildlife (which also apply to the covered species), as well as the following:

- Tri-colored bats should be considered as a covered species;
- Several commenters were against any sort of legalized bald eagle take;
- Several commenters believed an ITP should not be needed, and that the Service should not be involved in wind turbines;
- Mitigation should adhere to the principles outlined in recent policies and be landscape-based; and
- Impacts to covered species should be analyzed separately, conservation measures may be different based on differences between covered species, which should be investigated.

4.3.2 Bald and Golden Eagles

4.3.2.1 Bald Eagle

4.3.2.1.1 Operations Effects

Operations and maintenance activities would occur at all 22 covered projects.

4.3.2.1.1.1 Disturbance/Displacement

Eagles are unlikely to be disturbed by routine use of roads and other facilities (USFWS 2007b). Displacement or disturbance of eagles within operating wind farms, if it occurs at all, is not anticipated to be enough to cause significant interference with breeding, feeding, or sheltering. Although foraging by eagles may decrease in the vicinity of turbines, similar foraging habitat is widely available throughout the rest of the state of Iowa, and eagles are a highly mobile species with large home ranges. Additionally, several studies of various upland raptors have found most species to have a low sensitivity for displacement or disturbance at operating wind energy facilities (as cited in Whitfield and Madders 2006). All 22 covered projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with maintenance activities. As described in Section

3.4.2.1.1.4, bald eagles have been observed at all facilities surveyed, indicating that bald eagles continue to utilize the operating wind facilities. It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement for bald eagles in the vicinity of any facility over existing conditions.

4.3.2.1.1.2 Fatalities

Concern over eagle mortality at wind energy facilities has been a prominent issue in the past, largely due to the high levels of golden eagle mortality associated with the Altamont Wind Resource Area in California. New generation wind facilities, however, have greatly lessened their impacts mainly due to new turbine designs and careful siting. New generation turbines, like those used by MEC, have tubular support structures instead of lattice structures, which eliminate perching by raptors. Newer turbines also have larger blades, which reduces motion blur. Outside of California, where rates are greatly influenced by the Altamont Wind Resource Area, nationwide raptor mortality rates, including eagles, average 0.006 bird/turbine/year (Erickson et al. 2002). Studies have documented high raptor avoidance rates at modern wind facilities (Whitfield and Madders 2006; Chamberlain et al. 2006; Whitfield 2009). Raptors' mechanism for avoiding turbines is unknown; however, eagles are diurnal and have good eyesight, suggesting that they may be able to detect turbines visually. Currently, turbine avoidance by bald eagles is estimated at approximately 99% (USFWS 2013). Eagle use studies conducted by MEC at 18 of the covered projects also found that eagle use at reference points away from the turbines was on average 71% higher than eagle use within the project, indicating that, while bald eagles do not completely avoid wind farms, they may have reduced level of use near operating wind turbines.

Fatalities of bald eagles have the potential to occur under all seven of the alternatives being considered. Fatalities are not expected to differ among the seven alternatives because the only technique proven to minimize impacts to birds (including eagles) is turbine shutdown during high-risk periods triggered by real-time field observations and/or automated detectors (Marques et al. 2014). Therefore, for this analysis, we assume that raising cut-in speed and feathering turbines below the cut-in speed at night will not affect bald eagles.

As detailed in Section 3.4.2.1.1.4, bald eagles were observed at all projects surveyed during avian use surveys and eagle use surveys, indicating that all projects pose some risk of bald eagle fatality. Six bald eagles have been recorded as fatalities at MEC's covered projects, including Carroll (found on March 10, 2015), Charles City (found on October 22, 2016), Highland (found on February 17, 2016, and on March 7, 2017), Macksburg (found on December 4, 2014) and Rolling Hills (found on March 7, 2017).

MEC has requested a take limit of 10 bald eagles per year, or 300 bald eagles over the 30-year permit term (see Section 4.2.2 in the HCP). This estimate is likely high, as no reduction in take was applied for the minimization measures (i.e., carrion removal), because no model exists to accurately quantify the reduction in take from the minimization measures.

The Service manages bald eagle take at two geographic scales, regional Eagle Management Units (EMUs) and the Local Area Population (LAP), which are both discussed in detail below and shown on Figure 4.3-1.

Eagle Management Unit

Iowa falls within the Mississippi Flyway EMU (Figure 4.3-1), which has a population of 31,706 eagles (USFWS 2016c). The impact of taking 10 bald eagles per year represents 0.03% of the EMU population, which is well below the sustainable threshold of 5% set by the Service (USFWS 2016c). The 10 annual bald eagle fatalities are anticipated to be spread across the 2,021 existing turbines

Local Area Population

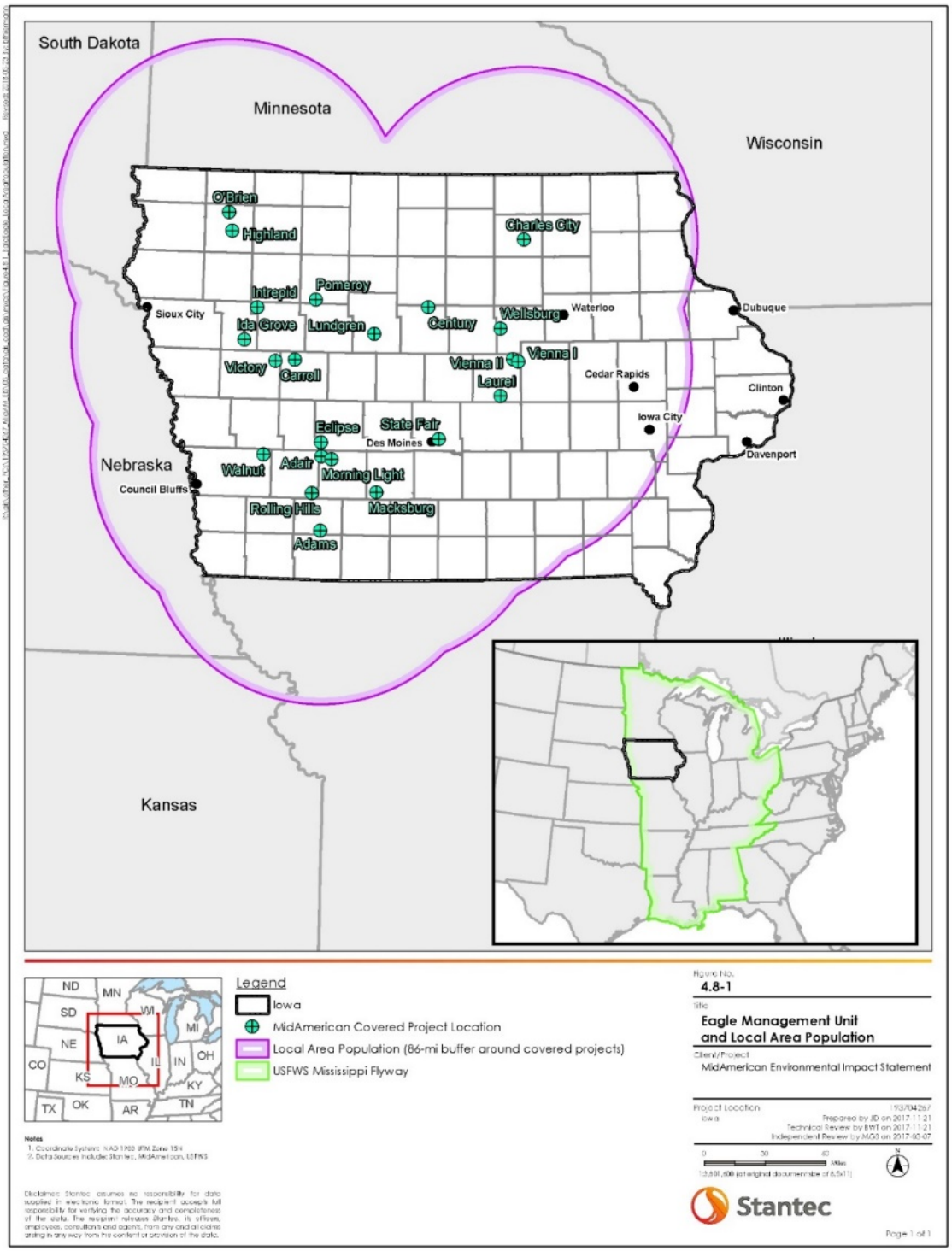
To determine the local area population for MEC, an 86-mi. buffer was placed around the 22 covered projects (the natal dispersal distance for bald eagles; USFWS 2016c), which results in a total area of approximately 84,874 square miles. The density of bald eagles within the Mississippi River Flyway is estimated at 0.045 eagle per square mile, resulting in a bald eagle population estimate of 3,819 bald eagles. The impact of taking 10 bald eagles per year represents 0.26% of the LAP, which is well below the sustainable take threshold of 5% set by the Service (USFWS 2016c).

4.3.2.1.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to bald eagles would occur.

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3) and includes funding a conservation fund, which may be used to purchase land or easements to protect bald eagles, to fund public education initiatives related to toxic substance abatement in the environment and funding rehabilitation of bald eagles, implementing education for farmers on proper carcass disposal, or for funding reforestation efforts (see MEC HCP Section 5.3.3.2). All of these would be considered a beneficial impact on bald eagles, as they provide a direct benefit (e.g., habitat preservation or rehabilitation of an injured eagle) or remove a threat to bald eagles (e.g., reducing toxic substances in the environment) but cannot be quantified at this time as the amount of each mitigation type is not known.

Figure 4.3-1. Eagle Management Unit and Local Area Population



4.3.2.2 Golden Eagle

4.3.2.2.1 Operations Effects

4.3.2.2.1.1 Disturbance/Displacement

A study of golden eagles in the Rocky Mountains showed decreased flight use of the rotor-swept zone post-construction compared to pre-construction when wind speeds were high enough for the blades to be spinning, suggesting detection and avoidance of turbines during eagle migration (Johnston et al. 2014). Golden eagles are a rare migrant and winter resident in Iowa (Kent and Dinsmore 1996), and disturbance/displacement as a result of project operations are unlikely to occur.

4.3.2.2.1.2 Fatalities

Pagel et al. (2013) published a report of 79 substantiated golden eagle fatalities or injuries from 28 wind energy facilities within the U.S.: 29 in Wyoming, 27 in California, 6 in Oregon, 5 in Colorado, 5 in New Mexico, 5 in Washington, 1 in Texas, and 1 in Utah. One golden eagle fatality has been reported from a non-MEC facility in Iowa during the winter of 2017. However, golden eagles are a rare migrant and winter resident in Iowa (Kent and Dinsmore 1996). Therefore, fatalities from operating wind turbines are considered to be unlikely to occur under any of the seven alternatives under consideration.

4.3.2.2.2 Mitigation Effects

Mitigation for bats and bald eagles is not anticipated to impact golden eagles due to their rarity and lack of nesting within the state. Some forms of bald eagle mitigation could have a slight positive impact on migrant or wintering golden eagles should they occur in the vicinity of the mitigation.

4.3.3 Federally-listed Species

4.3.3.1 Indiana Bat

4.3.3.1.1 Operations Effects

Operations and maintenance activities would occur at all 22 covered projects, though only projects within the species' range (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) have the potential to impact the Indiana bat. Disturbance/displacement and fatality impacts are described in detail below.

4.3.3.1.1.1 Disturbance/Displacement

Disturbance/displacement impacts on Indiana bats would be similar to those described for non-listed and non-covered bat species in Section 4.2.2.1.2. While noise, vibration, and/or increased human activity and traffic associated with maintenance activities could disturb Indiana bats, these activities would occur intermittently and over short periods of time. Of the eight projects within the range of the Indiana bat, only one project (Laurel) detected summer presence of the Indiana bat during acoustic surveys (see

Section 3.4.2.2.1.4), though an Indiana bat was killed at Macksburg sometime before July 13 (the date it was found; likely killed in the previous few days due to the carcass removal rate and carcass condition when found), indicating summer presence of Indiana bats at Macksburg as well. All eight projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with operations and maintenance activities. Migratory Indiana bats are not anticipated to be disturbed or displaced from any of the 22 covered projects for the reasons described in Section 4.2.2.1.1. It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement for Indiana bats in the vicinity of any project over existing conditions.

4.3.3.1.1.2 Fatalities

Indiana bats are susceptible to fatality from operating wind turbines, as described for non-listed and non-covered bats in Section 4.2.2.1.2. To-date, eight Indiana bat fatalities are publicly available from wind energy facilities in the United States (USFWS 2017e). In addition, one Indiana bat fatality was found during post-construction monitoring at the 22 covered projects (see Section 3.4.2.2.1.4).

In order to establish the best estimate of covered species fatality rates for the HCP, MEC conducted two consecutive years of bat and bird fatality monitoring across their fleet. This fatality monitoring was associated with the Section 6 Habitat Conservation Planning Grant activities, as described in Section 5.2.2 of the MEC HCP. It is not possible to find and retrieve all carcasses that fall under turbines because some are carried off or eaten by animals, difficult to see on the ground among grass and/or dirt clods, or fall outside of the area where searchers are looking. Because of this, bat carcasses retrieved under turbines are corrected for removal by scavengers (carcass removal rate), ability of searchers to find bat carcasses (searcher efficiency), and proportion of the area searched in which carcasses could fall (search area). Because of the uncertainty and variability around each of these corrections, bat fatality rates are reported as an average, with confidence intervals. The average rate (or "point estimate") is what is reasonably expected to be the actual fatality rate. The confidence intervals give the highest and lowest rates that are probable, given the carcass monitoring effort.

MEC is expecting that the number of covered species taken per year will be approximately equal to the point estimate for these species calculated from their on-the-ground fatality monitoring results. However, they acknowledge that the actual number taken over the course of the HCP term could actually be lower or higher. To address the unavoidable uncertainty in trying to estimate how many listed bats would be killed across the fleet, MEC has requested a permit to take up to the number at the upper 90% confidence interval. This means that they are 90% confident that the actual number of covered species taken will be less than the number at the upper 90% confidence interval. This provides maximum certainty to both MEC and the Service that the highest probable take number has been properly analyzed in the HCP and EIS.

Because the point estimate is actually the most likely number of bats to be taken, MEC will implement its conservation strategy and mitigation according to this estimate. Should post-permit monitoring indicate

that the actual take has exceeded or is likely to exceed the point estimate, MEC will implement adaptive management measures per Section 5.5 of the HCP.

These same assumptions and methods are carried through each of the EIS alternatives. Therefore, the range between the point estimate and 90% confidence interval is reported. Mitigation acres under each alternative are also calculated using this range of take.

Based upon values published in the MEC HCP [28], the fleet-wide take under the no operational adjustment scenario is estimated at 15 Indiana bats per year, with an estimated upper 90% confidence interval of 38 Indiana bats per year, or 450 to 1,140 Indiana bats over the 30-year permit term, at the 22 covered projects (375 turbines within the range of the Indiana bat). While not an alternative under consideration, the no operational adjustment scenario is included for comparison.

Because we do not know migratory corridors for Indiana bats, specific maternity colony locations, or other factors that may influence bat mortality at a specific turbine, for the purposes of calculating impacts to Indiana bats, we must assume that all turbines within the range of the Indiana bat have an equal likelihood of taking an Indiana bat. In addition, it is assumed that take could occur only at the 375 turbines within the range of the Indiana bat. Because no fatalities of listed bat species have been documented in Illinois or Iowa during the spring migration season to-date and only one spring fatality of an Indiana bat has been reported nationwide, we assume for our calculations that take would occur only during the peak bat fatality period (July 15 through October 15) or at turbines within 1,000 ft of suitable habitat (54 turbines) during the entire bat active season. As only 1 Indiana bat has been found as a fatality at the 22 covered projects (see Section 3.4.2.2.1.4), it is assumed for this analysis that Indiana bat fatalities follow the same seasonal distribution as non-listed and non-covered bats (see Section 4.2.2). Based upon these assumptions, under the no operational adjustment scenario, take is occurring as follows:

- 13.8% of Indiana bats between March 15 and July 14 (at 54 turbines)
- 82.7% of Indiana bats between July 15 and September 30 (at 375 turbines)
- 2.9% of Indiana bats between October 1 and October 15 (at 375 turbines)
- 0.6% of Indiana bats between October 16 and November 15 (at 54 turbines)

No Action Alternative

Under the No Action Alternative, all turbines fleet-wide would feather below the manufacturer's cut-in speed during the bat active season (March 15 to November 15; Table 4.1-1). Additionally, projects within the range of the Indiana bat (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) would feather below 6.9 m/s for the entire bat active season (March 15 to November 15) at turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat and at all turbines during the peak bat fatality period (July 15 to October 15).

[28] The upper 90% confidence interval represents the reasonable worst case scenario, and is what MEC is basing its permitted take on in the HCP alternative. It was assumed all alternatives with an ITP would follow similar protocols – the minimized point estimate represents the estimated level of take under the alternative, but the minimized 90% confidence interval represents the permitted level of take, and the reasonable worst case scenario.

Feathering below the manufacturer's cut-in speed is expected to reduce all bat fatalities by 35%, and feathering below 6.9 m/s is expected to reduce all bat fatalities by 81% (see Table 2.1-2) but is expected to avoid Indiana bat fatalities. By feathering turbines below 6.9 m/s within 1,000 ft of suitable habitat for the entire bat active season and at all turbines within the range of the Indiana bat during the peak bat fatality period (July 15 through October 15), the No Action Alternative is expected to avoid take of Indiana bats.

Alternative A

Under Alternative A, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the Indiana bat, by 62% (using the average reduction; Table 2.1-2).

Applying the 62% reduction to the estimated 15 to 38 Indiana bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 6 to 14 Indiana bats per year, or 180 to 420 Indiana bats over the 30-year permit term, under Alternative A.

Alternative B

Under Alternative B, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat would operate with a cut-in speed of 5.0 m/s for the entire bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.2-1) outside of the peak bat fatality period with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These actions would be expected to reduce all bat fatalities, including those of the Indiana bat, by 62% when operating at 5.0 m/s and by 35% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Because all Indiana bat fatalities would be expected to occur at turbines operating at 5.0 m/s, applying the 62% reduction to the estimated 14 to 38 Indiana bats that would be taken under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 6 to 14 Indiana bats per year, or 180 to 420 Indiana bats over the 30-year permit term, under Alternative B.

Alternative C

Under Alternative C, the cut-in speed of all turbines fleet-wide would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities, including those of the Indiana bat, by 62% during the period when operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming that Indiana bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. Applying these values and the expected reductions under the various curtailment regimes results in a fleet-wide take estimate of approximately 6 to 16 Indiana bats per year[29], or 180 to 480 Indiana bats over the 30-year permit term, under Alternative C.

Alternative D

Under Alternative D, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 through November 15; Table 4.1-1). No projects or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities, including those of the Indiana bat, by 35% (Table 2.1-2).

Applying this 35% reduction to the 15 to 38 Indiana bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 10 to 25 Indiana bats per year, or 300 to 750 Indiana bats over the 30-year permit term, under Alternative D.

Alternative E

Under Alternative E, all turbines fleet-wide would operate with a cut-in speed of 6.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the Indiana bat, by 63% (using the average reduction; Table 2.1-2).

Applying the 63% reduction to the estimated 15 to 38 Indiana bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 6 to 14 Indiana bats per year, or 180 to 420 Indiana bats over the 30-year permit term, under Alternative E.

HCP Alternative

Under MEC's HCP Alternative, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15; Table 4.1-1). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30 when temperatures are above 50°F at four projects: Macksburg, Lundgren, Charles City, and Wellsburg. Under the assumption that fatalities are evenly distributed among turbines, these operational protocols would be expected to reduce all bat fatalities, including those of the Indiana bat, by 62% between July 15 and September 30 at the four projects operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2). It is assumed that all Indiana bat fatalities occur above 50°F[30]. However, the exact distribution of fatalities among the wind

[29] Alternative C Equation: Fatalities = (Indiana bats$_{July15\text{-}October15}$ * 0.38) + ((Indiana bats$_{March15\text{-}July15}$ + Indiana bats$_{October16\text{-}Novembe15)}$ * 0.65)

[30] Since 99.0% of non-listed and non-covered bat fatalities are assumed to occur above 50°F, applying this same ratio to Indiana bats results in less than half an Indiana bat being killed under 50°F under the no operational adjustment scenario (38*0.01=0.38), which would round down to zero. This effect would be even less under the HCP alternative.

projects cannot be determined exactly with the data available. Therefore, MEC has chosen to assume that the most conservative fatality estimate is derived from the assumption of 35% reduction in fatalities of Indiana bats. We present the results of both assumptions in the analysis below.

Under the assumption that fatalities are evenly distributed across turbines, Indiana bat fatalities at 324 of the turbines within the species' range would be reduced by 35%. Indiana bat fatalities at Macksburg would be reduced by 62% between July 15 and September 30 (when 82.7% of fatalities occur) and by 35% during the rest of the year. Applying these reductions results in a fleet-wide take estimate of approximately 9 to 24 Indiana bats per year, or 270 to 720 Indiana bats over the 30-year permit term, under the HCP Alternative. Under the conservative assumption that reductions in fatalities to this species may only be 35%, the upper end of this fatality estimate is 25 per year, or 750 over the life of the permit.

4.3.3.1.1.3 Summary of Fatality Impacts

All seven alternatives under consideration result in fewer estimated Indiana bat fatalities than the no operational adjustment scenario (Table 4.3-1). As discussed in Section 3.4.2.2.1.3, the Indiana bat population is currently estimated to be 530,705 individuals, of which 51.2%, or 271,965 individuals, hibernate within the OCRU[31] (USFWS 2017a). The estimated annual fleet-wide take under the seven alternatives ranges from 0 to 25 Indiana bats per year, representing 0.000% to 0.009% of the OCRU population (Table 4.3-1). The estimated fleet-wide take over the 30-year permit term ranges from 0 to 750 Indiana bats, representing 0% to 0.276% of the OCRU population, though this take would be spread across 30 years and likely distributed across multiple maternity and hibernaculum colonies. The adult mortality rate of Indiana bats is assumed to be 12.7%[32], so take under the alternatives would increase this to up to 12.709% (a 0.07% increase over the current rate). In addition, this take will be fully offset through the implementation of mitigation. Population declines may occur due to WNS; however, it is reasonable to assume that the risk of take would also decrease proportionally to the loss in populations. Thus, estimated take under any of the seven alternatives under consideration is not anticipated to cause population-level impacts to Indiana bats and is therefore expected to be minor.

[31] Includes the range of the Indiana bat within Iowa, Illinois, Missouri, Arkansas and Oklahoma.
[32] Based on an adult survival of 87.3%, which is the value utilized in the USFWS REA model for Indiana bats.

Table 4.3-1. Summary of estimated annual fatalities of Indiana bats by alternative (see Table 4.1-1 for operational details), with 30-year permit term totals in parentheses. The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison.

	No Operational Adjustment Scenario	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Estimated Annual Take of Indiana bats	15 to 38	0	6 to 14	6 to 14	6 to 16	10 to 25	6 to 14	9 to 25
Annual Take as Percent of 2017 OCRU Population (271,965 bats)	0.006% to 0.014%	0.000%	0.002% to 0.005%	0.002% to 0.005%	0.002% to 0.006%	0.004% to 0.009%	0.002% to 0.005%	0.003% to 0.009%
Estimated Permit-term Take of Indiana bats	450 to 1,140	0	180 to 420	180 to 420	180 to 480	300 to 750	180 to 420	270 to 750
Permit-term Take as Percent of 2017 OCRU Population (271,965 bats)	0.165% to 0.419%	0.000%	0.066% to 0.154%	0.066% to 0.154%	0.066% to 0.176%	0.110% to 0.276%	0.066% to 0.154%	0.099% to 0.276%

4.3.3.1.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to Indiana bats would occur. Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) – considered a beneficial effect for the Indiana bat, as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for the Indiana bat, as the amount of summer bat habitat would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for Indiana bats, as Indiana bats do occasionally roost in structures (Benedict et al. 2017).

The amount of mitigation would vary by alternative and is summarized in Table 4.2-3.

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3), and the only bald eagle mitigation activities with the potential to impact Indiana bats are those related to land protection and reforestation, which may have a beneficial impact on Indiana bats if they occupy the mitigation sites or if they may occupy the sites in the future (i.e., the habitat is suitable and within the species' range), as these sites would be permanently protected, but this impact cannot be quantified at this time as the location and occupancy of mitigation sites is not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.3.3.2 Northern Long-eared Bat

4.3.3.2.1 Operations Effects

Operations and maintenance activities would occur at all 22 covered projects, all of which fall within the range of the northern long-eared bat.

4.3.3.2.1.1 Disturbance/Displacement

Disturbance/displacement impacts on northern long-eared bats would be similar to those described for non-listed and non-covered bat species in Section 4.2.2.1.1. While noise, vibration, and/or increased human activity and traffic associated with maintenance activities could disturb northern long-eared bats, these activities would occur intermittently and over short periods of time. Of the 22 covered projects, only 3 projects (Lundgren, Macksburg, and Rolling Hills) detected summer presence of the northern long-eared bat during acoustic surveys (see Section 3.4.2.2.2.4). All 22 covered projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with operations and maintenance activities. Migratory northern long-eared bats are not anticipated to be disturbed or displaced from any of the 22 covered projects for the reasons described in Section 4.2.2.1. It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement for northern long-eared bats in the vicinity of any project over existing conditions.

4.3.3.2.1.2 Fatalities

Northern long-eared bats are susceptible to fatality from operating wind turbines, as described for non-listed and non-covered bats in Section 4.2.2.1.2. As described in Section 4.3.3.1.1.2, the range between the point estimate and upper 90% confidence interval is reported for fatalities of the covered bat species. Mitigation acres under each alternative are also calculated using this range of take.

Based upon values published in the MEC HCP, the fleet-wide take under the no operational adjustment scenario is estimated at 13 northern long-eared bats per year, with an estimated upper 90% confidence interval of 33 northern long-eared bats per year, or 390 to 990 northern long-eared bats over the 30-year permit term, at the 22 covered projects (2,021 turbines). While not an alternative under consideration, the no operational adjustment scenario is included for comparison.

Because we do not know migratory corridors for northern long-eared bats, specific maternity colony locations, or other factors that may influence bat mortality at a specific turbine, for the purposes of calculating impacts to northern long-eared bats, we must assume that all turbines have an equal likelihood of taking a northern long-eared bat. Because no fatalities of listed bat species have been documented in Illinois or Iowa during the spring migration season to-date, we assume for our calculations that take would occur only during the peak bat fatality period (July 15 through October 15) or at turbines within 1,000 ft of suitable habitat (150 turbines) during the entire bat active season. As no northern long-eared bats have yet been found as fatalities at the 22 covered projects (see Section 3.4.2.2.2.4), it was assumed for this analysis that northern long-eared bat fatalities follow the same seasonal distribution as non-listed and non-covered bats (see Section 4.2.2.1.2). Based upon these assumptions, under the no operational adjustment scenario, take is occurring as follows:

- 13.8% of northern long-eared bats between March 15 and July 14 (at 150 turbines)
- 82.7% of northern long-eared bats between July 15 and September 30 (at 2,021 turbines)
- 2.9% of northern long-eared bats between October 1 and October 15 (at 2,021 turbines)
- 0.6% of northern long-eared bats between October 16 and November 15 (at 150 turbines)

No Action Alternative

Under the No Action Alternative, all turbines fleet-wide would feather below the manufacturer's cut-in speed during the bat active season (March 15 to November 15; Table 4.1-1). Additionally, projects within the range of the Indiana bat (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) would feather below 6.9 m/s for the entire bat active season (March 15 to November 15) at turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat and at all turbines during the peak bat fatality period (July 15 to October 15). Feathering below the manufacturer's cut-in speed is expected to reduce all bat fatalities by 35%, and feathering below 6.9 m/s is expected to reduce all bat fatalities by 81% (see Table 2.1-2) but is expected to avoid northern long-eared bat fatalities.

Under this Alternative, take of northern long-eared bats would be avoided at turbines within the range of the Indiana bat (375 turbines, including 54 turbines within 1,000 ft of suitable habitat). Applying the 35% reduction to the remaining 1,646 turbines (including 96 turbines within 1,000 ft of suitable habitat) results in a fleet-wide take estimate of approximately 7 to 17 northern long-eared bats per year, or 210 to 510 northern long-eared bats over the 30-year permit term, under the No Action Alternative.

Alternative A

Under Alternative A, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table

4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 62% (using the average reduction; Table 2.1-2).

Applying the 62% reduction to the estimated 13 to 33 northern long-eared bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 5 to 13 northern long-eared bats per year, or 150 to 390 northern long-eared bats over the 30-year permit term, under Alternative A.

Alternative B

Under Alternative B, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines within 1,000 ft. of suitable Indiana or northern long-eared bat summer habitat would operate with a cut-in speed of 5.0 m/s for the entire bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.2-1) outside of the peak bat fatality period, with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These actions would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 62% when operating at 5.0 m/s and by 35% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Because all northern long-eared bat fatalities would be expected to occur at turbines operating at 5.0 m/s, applying the 62% reduction to the estimated 13 to 33 northern long-eared bats that would be taken under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 5 to 13 northern long-eared bats per year, or 150 to 390 northern long-eared bats over the 30-year permit term, under Alternative B.

Alternative C

Under Alternative C, the cut-in speed of all turbines fleet-wide would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 62% during the period when operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming that northern long-eared bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. Applying these values and the expected reductions under the various

curtailment regimes results in a fleet-wide take estimate of approximately 5 to 14 northern long-eared bats per year[33], or 150 to 420 northern long-eared bats over the 30-year permit term, under Alternative C.

Alternative D

Under Alternative D, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 through November 15; Table 4.1-1). No projects or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 35% (Table 2.1-2).

Applying the 35% reduction to the estimated 13 to 33 northern long-eared bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 8 to 21 northern long-eared bats per year, or 240 to 630 northern long-eared bats over the 30-year permit term, under Alternative D.

Alternative E

Under Alternative E, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 63% (using the average reduction; Table 2.1-2).

Applying the 63% reduction to the estimated 13 to 33 northern long-eared bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 5 to 13 northern long-eared bats per year, or 150 to 390 northern long-eared bats over the 30-year permit term, under Alternative E.

HCP Alternative

Under MEC's HCP Alternative, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15; Table 4.1-1). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30 when temperatures are above 50°F at four projects: Macksburg, Lundgren, Charles City, and Wellsburg. Given the percent reductions from studies cited in Table 2.1-2, with the assumption that northern long-eared bat fatalities are evenly distributed among all turbines, we could expect that these operational protocols would be expected to reduce all bat fatalities, including those of the northern long-eared bat, by 62% between July 15 and September 30 at the four projects operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2). It is assumed that all northern long-eared bat fatalities occur above 50°F[34]. However, the exact distribution of fatalities among the wind projects cannot be determined exactly with the data available. Therefore,

[33] Alternative C Equation: Fatalities = (28.3 northern long-eared bats * 0.38) + (4.7 northern long-eared bats * 0.65)
[34] Since 99.0% of non-listed and non-covered bat fatalities are assumed to occur above 50°F, applying this same ratio to northern long-eared bats results in less than half a northern long-eared bat being killed under 50°F under the no operational adjustment scenario (33*0.01=0.33), which would round down to zero. This effect would be even less under the HCP alternative.

MEC has chosen to assume that the most conservative fatality estimate is derived from the assumption of 35% reduction in fatalities of northern long-eared bats. We present the results of both assumptions in the analysis below.

Under the assumption of even distribution of fatalities, northern long-eared bat fatalities at 1,753 of the turbines would be reduced by 35%. Northern long-eared bat fatalities at 268 turbines (Macksburg, Lundgren, Charles City, and Wellsburg) would be reduced by 62% between July 15 and September 30 (when 82.7% of fatalities occur) and by 35% during the rest of the year. Applying these reductions results in a fleet-wide take estimate of approximately 8 to 20 northern long-eared bats per year, or 240 to 600 northern long-eared bats over the 30-year permit term, under the HCP Alternative. Under the conservative assumption that reductions in fatalities to this species may only be 35%, the upper end of this fatality estimate is 21 per year, or 630 over the life of the permit.

4.3.3.2.1.3 Summary of Fatality Impacts

All seven alternatives under consideration result in fewer northern long-eared bat fatalities than the no operational adjustment scenario (Table 4.3-2). As described in Section 3.4.2.2.2.3, the northern long-eared bat population is currently estimated to be 6,546,718 individuals, of which an estimated 102,330 individuals summer in Iowa (USFWS 2016d). The estimated annual fleet-wide take under the seven alternatives ranges from 5 to 21 northern long-eared bats per year, representing 0.005% to 0.021% of the Iowa summer population (Table 4.3-2). The estimated fleet-wide take over the 30-year permit term ranges from 150 to 630 northern long-eared bats, representing 0.147% to 0.616% of the Iowa summer population, though this take would be spread across 30 years and likely distributed across multiple maternity populations and hibernaculum colonies. The adult mortality rate of northern long-eared bats is assumed to be 12.7%[35], so take under the alternatives would increase this to up to 12.721% (a 0.17% increase over the current rate). In addition, this take will be fully offset through the implementation of mitigation. Population declines may occur due to WNS; however, it is reasonable to assume that the risk of take would also decrease proportionally to the loss in populations. Thus, estimated take under any of the seven alternatives under consideration would not be anticipated to cause population-level impacts to northern long-eared bats and is therefore expected to be minor.

[35] Based on an adult survival of 87.3%, which is the value utilized in the USFWS REA model for northern long-eared bats.

Table 4.3-2. Summary of estimated annual and permit-term fatalities of northern long-eared bats by alternative (see Table 4.1-1 for operational details). The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison.

	No Operational Adjustment Scenario	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Estimated Annual Take of Northern long-eared Bats	13 to 33	7 to 17	5 to 13	5 to 13	5 to 14	8 to 21	5 to 13	8 to 21
Annual Take as Percent of 2016 Iowa Population (102,330 bats)	0.013% to 0.032%	0.007% to 0.017%	0.005% to 0.013%	0.005% to 0.013%	0.005% to 0.014%	0.008% to 0.021%	0.005% to 0.013%	0.008% to 0.021%
Estimated Permit-term Take of Northern long-eared Bats	390 to 990	210 to 510	150 to 390	150 to 390	150 to 420	240 to 630	150 to 390	240 to 630
Permit-term Take as Percent of 2016 Iowa Population (102,330 bats)	0.381% to 0.967%	0.205% to 0.498%	0.147% to 0.381%	0.147% to 0.381%	0.147% to 0.410%	0.235% to 0.616%	0.147% to 0.381%	0.235% to 0.586%

4.3.3.2.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to northern long-eared bats would occur.

Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) – considered a beneficial effect for the northern long-eared bat, as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for the northern long-eared bat, as the amount of summer bat habitat would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for northern long-eared bats, as northern long-eared bats do occasionally roost in structures (USFWS 2016d).

The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative and is summarized in Table 4.2-3.

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3), and the only bald eagle mitigation activities with the potential to impact northern long-eared bats are those related to land protection and reforestation, which may have a beneficial impact on northern long-eared bats if they occupy the mitigation sites or if they may occupy the mitigation sites in the future (i.e., habitat is suitable for the species). These sites would be permanently protected, but this impact cannot be quantified at this time, as the location and occupancy of mitigation sites is not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.3.4 Additional Covered Species

4.3.4.1 Little Brown Bat

4.3.4.1.1 Operations and Maintenance Effects

Operations and maintenance activities would occur at all 22 covered projects, all of which fall within the range of the little brown bat.

4.3.4.1.1.1 Disturbance/Displacement

Disturbance/displacement impacts on little brown bats would be similar to those described for non-listed and non-covered bat species in Section 4.2.2.1.1. While noise, vibration, and/or increased human activity and traffic associated with maintenance activities could disturb little brown bats, these activities would occur intermittently and over short periods of time. All 22 covered projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with maintenance activities. Migratory little brown bats are not anticipated to be disturbed or displaced from any of the 22 covered projects for the reasons described in Section 4.2.2.1.1. It is not anticipated that the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement for little brown bats in the vicinity of any project over existing conditions.

4.3.4.1.1.2 Fatalities

Little brown bats are susceptible to fatality from operating wind turbines, as described for non-listed and non-covered bats in Section 4.2.2.1.2. As described in Section 4.3.3.1.1.2, for fatalities of the covered bat species, the range between the point estimate and upper 90% confidence interval is reported. Mitigation acres under each alternative are also calculated using this range of take.

Based upon values published in the MEC HCP, the fleet-wide take under the no operational adjustment scenario is estimated at 985 little brown bats per year, with an estimated upper 90% confidence interval of 1,133 little brown bats per year, or 29,550 to 33,990 little brown bats over the 30-year permit term, at the 22 covered projects (2,021 turbines). While not an alternative under consideration, the no operational adjustment scenario is included for comparison.

Because we do not know migratory corridors for little brown bats, specific maternity colony locations, or other factors that may influence bat mortality at a specific turbine, for the purposes of calculating impacts to little brown bats, it is assumed that this take could occur at any of the 2,021 turbines and that all turbines have an equal likelihood of taking a little brown bat[36]. In addition, for the purposes of calculating impacts to little brown bats, it is assumed that take could occur during the entire bat active season (March 15 to November 15) at any of the 2,021 turbines (regardless of whether they are within 1,000 ft of suitable habitat). It was assumed for this analysis that little brown bat fatalities follow the same seasonal distribution as non-listed and non-covered bats (see Section 4.2.2.1.2).

No Action Alternative

Under the No Action Alternative, all turbines fleet-wide would feather below the manufacturer's cut-in speed during the bat active season (March 15 to November 15; Table 4.1-1). Additionally, projects within the range of the Indiana bat (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) would feather below 6.9 m/s for the entire bat active season (March 15 to November 15) at turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat and at all turbines during the peak bat fatality period (July 15 to October 15). Feathering below the manufacturer's cut-in speed is expected to reduce all bat fatalities by 35%, and feathering below 6.9 m/s is expected to reduce all bat fatalities by 81% (see Table 2.1-2) but is expected to avoid little brown bat fatalities.

Under this Alternative, take of little brown bats would be avoided at turbines within 1,000 ft of suitable bat habitat within the range of the Indiana bat (54 turbines) and at all turbines within the range of the Indiana bat (375 turbines) between July 15 and September 30 (when 82.7% of fatalities occur). At the remaining projects and at turbines within the range of the Indiana bat but located more than 1,000 ft from suitable habitat, fatalities would be expected to be reduced by 35%. Applying these reductions to the 985 to 1,133 little brown bats that would be expected to be taken under the no operational adjustment scenario results in an estimated 536 to 617 little brown bat fatalities per year, or 16,080 to 18,510 little brown bats over the 30-year permit term, under the No Action Alternative.

Alternative A

Under Alternative A, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table

[36] Per-turbine little brown bat take is 985/2021 to 1133/2021 and attributed to each project based on the total number of turbines; take calculations are thus the same as for non-listed and non-covered bat species, with the exception that turbines operating at 6.9 m/s would not be expected to have little brown bat take (replace the 0.19 with 0 in the equations).

4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the little brown bat, by 62% (using the average reduction; Table 2.1-2).

Applying the 62% reduction to the estimated 985 to 1,133 little brown bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 374 to 431 little brown bats per year, or 11,220 to 12,930 little brown bats over the 30-year permit term, under Alternative A.

Alternative B

Under Alternative B, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat would operate with a cut-in speed of 5.0 m/s for the entire bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.2-1) outside of the peak bat fatality period with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These actions would be expected to reduce all bat fatalities, including those of the little brown bat, by 62% when operating at 5.0 m/s and by 35% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming little brown bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. In addition, approximately 7.4% of all fatalities would occur at turbines within 1,000 ft of suitable habitat (150 of the 2,021 turbines). Applying these values and the expected reductions results in a fleet-wide take estimate of 410 to 471 little brown bats per year, or 12,300 to 14,130 little brown bats over the 30-year permit term, under Alternative B.

Alternative C

Under Alternative C, the cut-in speed of all turbines fleet-wide would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities, including those of the little brown bat, by 62% during the peak bat fatality period when operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming that little brown bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. Applying these values and the expected reductions under the various curtailment regimes results in a fleet-wide take estimate of approximately 413 to 475 little brown bats per year, or 12,390 to 14,250 little brown bats over the 30-year permit term, under Alternative C.

Alternative D

Under Alternative D, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 through November 15; Table 4.1-1). No projects or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities, including those of the little brown bat, by 35% (Table 2.1-2).

Applying the 35% reduction to the estimated 985 to 1,133 little brown bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 640 to 736 little brown bats per year, or 19,200 to 22,080 little brown bats over the 30-year permit term, under Alternative D.

Alternative E

Under Alternative E, all turbines fleet-wide would operate with a cut-in speed of 6.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the little brown bat, by 63% (using the average reduction; Table 2.1-2).

Applying the 63% reduction to the estimated 985 to 1,133 little brown bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 364 to 419 little brown bats per year, or 10,920 to 12,570 little brown bats over the 30-year permit term, under Alternative E.

HCP Alternative

Under MEC's HCP Alternative, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15; Table 4.1-1). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30 when temperatures are above 50°F at four projects: Macksburg, Lundgren, Charles City, and Wellsburg. Given the percent reductions from studies cited in Table 2.1-2, with the assumption that little brown bat fatalities are evenly distributed among all turbines, we could expect that these operational protocols would be expected to reduce all bat fatalities, including those of the little brown bat, by 62% during the peak bat fatality period at the four projects operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2). It is assumed that 99.0% of little brown bat fatalities occur above 50°F (same as non-listed and non-covered bat species, see Section 4.2.2.1.2.6). However, the exact distribution of fatalities among the wind projects cannot be determined exactly with the data available. Therefore, MEC has chosen to assume that the most conservative fatality estimate is derived from the assumption of 35% reduction in fatalities of little brown bats. We present the results of both assumptions in the analysis below.

Under the assumption of even distribution of fatalities, little brown bat fatalities at 1,753 of the turbines would be reduced by 35%. Ninety-nine percent of little brown bat fatalities at 268 turbines (Macksburg, Lundgren, Charles City, and Wellsburg) would be reduced by 62% between July 15 and September 30

(when 82.7% of fatalities occur) and by 35% during the rest of the year. The remaining 1% of fatalities at these turbines would be reduced by 35%. Applying these reductions results in a fleet-wide take estimate of 611 to 703 little brown bats per year, or 18,330 to 21,090 little brown bats over the 30-year permit term, under the HCP Alternative. Under the conservative assumption that reductions in fatalities to this species may only be 35%, the upper end of this fatality estimate is 736 per year, or 22,080 over the life of the permit..

4.3.4.1.1.3 Summary of Fatality Impacts

All seven alternatives under consideration result in fewer little brown bat fatalities than the no operational adjustment scenario (Table 4.3-3). The estimated fleet-wide take over the 30-year permit term ranges from 12,570 to 22,080 little brown bats, though this take would be spread across 30 years and likely distributed across multiple local populations. Using the Russell et al (2015) Iowa population estimate of 420,000, the estimated annual take of 419 to 736 little brown bats would represent approximately 0.1% to 0.17% of the state's population. Using the population size of 294,603 as estimated in the MEC HCP, estimated annual take would represent 0.14% to 0.25% of the state's population. The adult mortality rate of little brown bats is assumed to be 13.5%[37], so take under the alternatives would increase this to up to 13.75%. In addition, this take will be offset through the implementation of mitigation. Population declines may occur due to WNS; however, it is reasonable to assume that the risk of take would also decrease proportionally to the loss in populations. Thus, take under any of the seven alternatives under consideration would not be anticipated to cause population-level impacts to little brown bats and is therefore minor.

Table 4.3-3. Summary of estimated annual and permit-term fatalities of little brown bats by alternative (see Table 4.1-1 for operational details). The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison.

	No Operational Adjustment Scenario	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Estimated Annual Take of Little Brown Bats	985 to 1,133	536 to 617	374 to 431	410 to 471	413 to 475	640 to 736	364 to 419	611 to 736
Estimated Permit-term Take of Little Brown Bats	29,550 to 33,990	16,080 to 18,510	11,220 to 12,930	12,300 to 14,130	12,390 to 14,250	19,200 to 22,080	10,920 to 12,570	18,330 to 22,080

[37] Based on an adult survival of 86.5%, which is the value utilized in the USFWS REA model for little brown bats.

4.3.4.1.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to little brown bats would occur.

Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) – considered a beneficial effect for the little brown bat, as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for the little brown bat, as the amount of summer bat habitat would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for little brown bats, as little brown bats commonly roost in structures (Humphrey and Cope 1976; Kunz, et al. 1998).

The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative and is summarized in Table 4.2-3.

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3), and the only bald eagle mitigation activities with the potential to impact little brown bats are those related to land protection and reforestation, which may have a beneficial impact on little brown bats if they occupy the mitigation sites or may occupy these sites in the future (i.e. habitat is suitable), as these sites would be permanently protected. This impact cannot be quantified at this time since the locations and occupancy of mitigation sites are not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.3.4.2 Tri-colored Bat

4.3.4.2.1 Operations and Maintenance Effects

Operations and maintenance activities would occur at all 22 covered projects, all of which fall within the range of the tri-colored bat.

4.3.4.2.1.1 Disturbance/Displacement

Disturbance/displacement impacts on tri-colored bats would be similar to those described for non-listed and non-covered bat species in Section 4.2.2.1.1. While noise, vibration, and/or increased human activity and traffic associated with maintenance activities could disturb tri-colored bats, these activities would occur intermittently and over short periods of time. All 22 covered projects are already built and operating, and local populations are likely accustomed to the level of noise and human activity associated with maintenance activities. Migratory tri-colored bats are not anticipated to be disturbed or displaced from any of the 22 covered projects for the reasons described in Section 4.2.2.1.1. It is not anticipated that

the operational protocols (i.e., cut-in speed adjustments) under any of the seven alternatives under consideration would either increase or decrease the level of disturbance/displacement of tri-colored bats in the vicinity of any project over existing conditions.

4.3.4.2.1.2 Fatalities

Tri-colored bats are susceptible to fatality from operational wind turbines, as described for non-listed and non-covered bats in Section 4.2.2.1.2 As described in Section 4.3.3.1.1.2, for fatalities of the covered bat species, the range between the point estimate and upper 90% confidence interval is reported. Mitigation acres under each alternative are also calculated using this range of take.

Based upon values published in the MEC HCP, the fleet-wide take under the no operational adjustment scenario is estimated at 596 tri-colored bats per year, with an estimated upper 90% confidence interval of 706 tri-colored bats per year, or 17,880 to 21,180 tri-colored bats over the 30-year permit term, at the 22 covered projects (2,021 turbines). While not an alternative under consideration, the no operational adjustment scenario is included for comparison.

Because we do not know migratory corridors for tri-colored bats, specific maternity colony locations, or other factors that may influence bat mortality at a specific turbine, for the purposes of calculating impacts to tri-colored bats, it is assumed that this take could occur at any of the 2,021 turbines and that all turbines have an equal likelihood of taking a tri-colored bat[38]. In addition, for the purposes of calculating impacts to tri-colored bats, it is assumed that take could occur during the entire bat active season (March 15 to November 15) at any of the 2,021 turbines (regardless of whether they are within 1,000 ft of suitable habitat or not). It is assumed for this analysis that tri-colored bat fatalities follow the same seasonal distribution as non-listed and non-covered bats (see Section 4.2.2.1.2).

<u>No Action Alternative</u>

Under the No Action Alternative, all turbines fleet-wide would feather below the manufacturer's cut-in speed during the bat active season (March 15 to November 15; Table 4.1-1). Additionally, projects within the range of the Indiana bat (Vienna I, Vienna II, Laurel, State Fair, Macksburg, Adair, Morning Light, and Eclipse) would feather below 6.9 m/s for the entire bat active season (March 15 to November 15) at turbines within 1,000 ft of suitable Indiana or northern long-eared bat summer habitat and at all turbines during the peak bat fatality period (July 15 to October 15). Feathering below the manufacturer's cut-in speed is expected to reduce all bat fatalities by 35%, and feathering below 6.9 m/s is expected to reduce all bat fatalities by 81% (see Table 2.1-2).

Under this alternative, take of tri-colored bats would be reduced by 81% at turbines within 1,000 ft of suitable bat habitat within the range of the Indiana bat (54 turbines) and at all turbines within the range of the Indiana bat (375 turbines) during the peak bat fatality period between July 15 and September 30 (when 82.7% of fatalities occur). At the remaining projects and at turbines within the range of the Indiana

[38] Per-turbine tri-colored bat take is 596/2021 to 706/2021, and attributed to each project based on the total number of turbines; take calculations are thus the same as for non-listed and non-covered bat species.

bat but located more than 1,000 ft from suitable habitat, fatalities would be expected to be reduced by 35%. Applying these reductions to the 596 to 706 tri-colored bats that would be expected to be taken under the no operational adjustment scenario results in an estimated 343 to 406 tri-colored bat fatalities per year, or 10,290 to 12,180 tri-colored bats over the 30-year permit term, under the No Action Alternative.

Alternative A

Under Alternative A, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 62% (using the average reduction; Table 2.1-2).

Applying the 62% reduction to the estimated 596 to 706 tri-colored bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 226 to 268 tri-colored bats per year, or 6,780 to 8,040 tri-colored bats over the 30-year permit term, under Alternative A.

Alternative B

Under Alternative B, all turbines fleet-wide would operate with a cut-in speed of 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines within 1,000 ft. of suitable Indiana or northern long-eared bat summer habitat would operate with a cut-in speed of 5.0 m/s for the entire bat active season (March 15 through November 15). All other turbines would operate at their respective manufacturer's cut-in speed (see Table 1.2-1) outside of the peak bat fatality period with blades feathered below the manufacturer's cut-in speed from March 15 through July 14 and October 16 through November 15 (see Section 2.2.1.1.4). These actions would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 62% when operating at 5.0 m/s and by 35% when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming tri-colored bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. In addition, approximately 7.4% of all fatalities would occur at turbines within 1,000 ft of suitable habitat (150 of the 2,021 turbines). Applying these values and the expected reductions results in a fleet-wide take estimate of 248 to 294 tri-colored bats per year, or 7,440 to 8,820 tri-colored bats over the 30-year permit term, under Alternative B.

Alternative C

Under Alternative C, the cut-in speed of all turbines fleet-wide would be raised to 5.0 m/s during the peak bat fatality period (July 15 through October 15) with blades feathered below the cut-in speed (Table 4.1-1). In addition, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) from March 15 through July 14 and from October 16 through November 15 (see Section 2.2.1.1.4). These operational protocols would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 62% during the peak bat fatality period when operating at 5.0 m/s and by

35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2).

Assuming tri-colored bat fatalities follow the same seasonal distribution as all bats (see Section 4.2.2.1.2), 85.6% of fatalities would occur during the peak bat fatality period, and 14.4% would occur outside of this time period. Applying these values and the expected reductions under the various curtailment regimes results in a fleet-wide take estimate of approximately 250 to 296 tri-colored bats per year, or 7,500 to 8,880 tri-colored bats over the 30-year permit term, under Alternative C.

Alternative D

Under Alternative D, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 through November 15; Table 4.1-1). No projects or turbines would have raised cut-in speeds. This operational protocol would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 35% (Table 2.1-2).

Applying this 35% reduction to the estimated 596 to 706 tri-colored bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 387 to 459 tri-colored bats per year, or 11,610 to 13,770 tri-colored bats over the 30-year permit term, under Alternative D.

Alternative E

Under Alternative E, all turbines fleet-wide would operate with a cut-in speed of 6.0 m/s during the entire bat active season (March 15 through November 15) with blades feathered below the cut-in speed (Table 4.1-1). This operational protocol would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 63% (using the average reduction; Table 2.1-2).

Applying the 63% reduction to the estimated 596 to 706 tri-colored bats that would be killed under the no operational adjustment scenario results in a fleet-wide take estimate of approximately 221 to 261 tri-colored bats per year, or 6,630 to 7,830 tri-colored bats over the 30-year permit term, under Alternative E.

HCP Alternative

Under MEC's HCP Alternative, all turbines fleet-wide would be feathered below their respective manufacturer's cut-in speed (see Table 1.2-1) for the entire bat active season (March 15 to November 15; Table 4.1-1). Additionally, the cut-in speed would be raised to 5.0 m/s from July 15 to September 30 when temperatures are above 50°F at four projects: Macksburg, Lundgren, Charles City, and Wellsburg. Given the percent reductions from studies cited in Table 2.1-2, with the assumption that tricolored bat fatalities are evenly distributed among all turbines, we could expect that these operational protocols would be expected to reduce all bat fatalities, including those of the tri-colored bat, by 62% during the July 15 to September 30 period at the four projects operating at 5.0 m/s and by 35% during the remainder of the bat active season when operating at the manufacturer's cut-in speed (see Table 2.1-2). It is assumed that 99.0% of tri-colored bat fatalities occur above 50°F (same as non-listed and non-covered bat species,

see Section 4.2.2.1.2.6). However, the exact distribution of fatalities among the wind projects cannot be determined exactly with the data available. Therefore, MEC has chosen to assume that the most conservative fatality estimate is derived from the assumption of 35% reduction in fatalities of tricolored bats. We present the results of both assumptions in the analysis below.

Under the assumption of even distribution of fatalities, tri-colored bat fatalities at 1,753 of the turbines would be reduced by 35%. Ninety-nine percent of tri-colored bat fatalities at 268 turbines (Macksburg, Lundgren, Charles City, and Wellsburg) would be reduced by 62% between July 15 and September 30 (when 82.7% of fatalities occur) and by 35% during the rest of the year. The remaining 1% of fatalities at these turbines would be reduced by 35%. Applying these reductions results in a fleet-wide take estimate of 370 to 438 tri-colored bats per year, or 11,100 to 13,140 tri-colored bats over the 30-year permit term, under the HCP Alternative. Under the conservative assumption that reductions in fatalities to this species may only be 35%, the upper end of this fatality estimate is 459 per year, or 13,770 over the life of the permit.

4.3.4.2.1.3 Summary of Fatality Impacts

All seven alternatives under consideration result in fewer tri-colored bat fatalities than the no operational adjustment scenario (Table 4.3-4). The estimated fleet-wide take over the 30-year permit term ranges from 6,630 to 13,770 tri-colored bats, though this take would be spread across 30 years and likely distributed across multiple populations. No range-wide or regional population estimates for tri-colored bats are currently available; however, assuming that the tri-colored bat population in Iowa is at least 102,330 individuals (the current estimate for northern long-eared bats), the estimated annual take of 221 to 459 tri-colored bats would represent at a maximum 0.2% to 0.5% of the state's population, though the population size may be much greater[39]. The adult mortality rate of tri-colored bats is not known, but assuming a similar rate of little brown bats (13.5%)[40], take under the alternatives would increase this to up to 14.0%. In addition, this take will be offset through the implementation of mitigation. Population declines may occur due to WNS; however, it is reasonable to assume that the risk of take would also decrease proportionally to the loss in populations. Thus, take under any of the seven alternatives under consideration would not be expected to cause population-level impacts to tri-colored bats.

[39] The MEC HCP used several methods to estimate a population size of 161,731 tri-colored bats in Iowa. For the purposes of this EIS, the smaller, more conservative estimate of 102,330 individuals was used, but the population size is likely larger.
[40] Based on an adult survival of 86.5%, which is the value utilized in the USFWS REA model for little brown bats.

Table 4.3-4. Summary of estimated annual and permit-term fatalities of tri-colored bats by alternative (see Table 4.1-1 for operational details). The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison.

	No Operational Adjustment Scenario	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Estimated Annual Take of Tri-colored bats	596 to 706	343 to 406	226 to 268	248 to 294	250 to 296	387 to 459	221 to 261	370 to 459
Estimated Permit-term Take of Tri-colored Bats	17,880 to 21,180	10,290 to 12,180	6,780 to 8,040	7,440 to 8,820	7,500 to 8,880	11,610 to 13,770	6,630 to 7,830	11,100 to 13,770

4.3.4.2.2 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no impacts to tri-colored bats would occur.

Mitigation for the covered bat species would occur under the six action alternatives and would include:

1. The protection of existing summer bat habitat (i.e., woodlands) - considered a beneficial effect for the tri-colored bat, as habitat would be permanently protected.

2. Woodland restoration – considered a beneficial effect for the tri-colored bat, as the amount of summer bat habitat would increase and the mitigation sites would be permanently protected.

3. Preservation and stabilization of structures (e.g., barns) used as roosts by bats – considered a beneficial effect for tri-colored bats, as tri-colored bats occasionally roost in structures.

The amount of mitigation (acres of habitat protection/restoration and number of preserved structures) would vary by alternative and is summarized in Table 4.2-3.

Mitigation for bald eagles is the same under all six action alternatives (see Section 2.2.1.1.3), and the only bald eagle mitigation activities with the potential to impact tri-colored bats are those related to land protection and reforestation, which may have a beneficial impact on tri-colored bats if they occupy the mitigation sites or may occupy these sites in the future (i.e. habitat is suitable and within the species' range), as these sites would be permanently protected. This impact cannot be quantified at this time since

the locations and occupancy of mitigation sites are not known. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.3.5 Mitigation for Impacts

Mitigation is proposed for all the covered species, including the bald eagle, Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat. No specific mitigation is proposed for the other rare, threatened or endangered species, but some species may also benefit from the proposed mitigation.

4.4 AIR QUALITY AND CLIMATE

The following MEC project design standards and BMPs outlined in the MEC BBCS relate to air quality and are implemented at all 22 covered MEC projects:

- No burning or burying of waste materials will occur at any project site. The contractor will be responsible for the removal of all waste materials from the construction area. All contaminated soil and construction debris will be disposed of in approved landfills in accordance with appropriate environmental regulations.

- Construction activities will be performed using standard construction best management practices so as to minimize the potential for accidental spills of solid material, contaminants, debris, and other pollutants. Excavated material or other construction materials will not be stockpiled or deposited near or on stream banks.

4.4.1 Impact Criteria

The Clean Air Act of 1970 (CAA) and the CAA Amendments of 1990 established NAAQS for selected pollutants. The NAAQS established maximum levels of acceptable background pollution with a margin of safety to protect public health and welfare. NAAQS compliance in Iowa is monitored by IDNR.

Per the CAA and the Amendments of 1990, USEPA has established New Source Performance Standards (NSPS) to regulate air pollution emissions from new stationary sources. These standards apply to various facilities, but because wind turbines generate electricity without releasing air pollutants, NSPSs do not apply to this analysis.

The Acid Rain Program, established by CAA Amendments of 1990 to lower sulfur dioxide and nitrogen oxides emissions, does not apply to this analysis because wind turbines generate electricity without releasing air pollutants. Likewise, the Prevention of Significant Deterioration does not apply to this analysis for the same reason.

No activities would emit new major sources of air pollutants. In general, existing projects are expected to have a long term beneficial effect on air quality by replacing carbon producing sources of energy with clean, renewable energy. No concerns related to air quality and climate were identified during the scoping period.

4.4.2 Operations Effects

No significant adverse effect to air quality would occur as a result of operations and maintenance, regardless of which of the seven alternatives under consideration is chosen. Adverse impacts to air quality would not occur, as wind turbines do not release pollutants into the atmosphere. Project operations and maintenance may require a small amount of vehicular traffic resulting in the release of carbon dioxide emissions and particulates. Some localized impacts to air quality may result from engine exhaust emitted from maintenance equipment and vehicles. These emissions are not estimated to have a significant effect on local or regional air quality or contribute greatly to the amount of greenhouse gases. Project operations and maintenance would not generate any new sources of air pollutants.

The seven alternatives differ from each other with respect to operational adjustments, which affects the amount of energy produced by the wind facilities and in turn affects the amount of carbon and greenhouse gases produced by MEC. The more energy produced by wind, the less that needs to be produced by burning fossil fuels, thereby lowering the amount of carbon and greenhouse gases produced by MEC, which has a beneficial impact on climate change. Higher cut-in speeds result in less operational time and lost energy production potential (i.e., a cut-in speed of 6.9 m/s would result in less energy produced than a cut-in speed of 5.0 m/s, etc.). Energy production would be highest under Alternative D, which would not result in any lost power production and thus no increase in CO_2 emissions. MEC modeled the power production loss (in MW hours [MWh]) and the resulting increase in CO_2 emissions (resulting from the lost power production from implementing operational adjustments under each alternative [i.e., the lost power would need to be made up through the burning of fossil fuels]), and that analysis is summarized in Table 4.4-1.

Table 4.4-1. Summary of estimated annual increases in CO_2 emissions by alternative (see Table 4.1-1 for operational details). The No Operational Adjustment Scenario is not an alternative under consideration but is included for comparison and used as the baseline for losses in power production (lost MWh) and increases in CO_2 emissions.

Alternative	Total Annual Lost MWh[1]	Annual CO_2 Increase (in tons)[2]
No Operational Adjustment Scenario	0	0
No Action Alternative	114,775	119,653
Alternative A	135,437	141,193
Alternative B	60,004	62,554
Alternative C	50,935	53,100
Alternative D	0	0
Alternative E	298,940	311,645
HCP Alternative	5,124	5,342

[1] A megawatt hour (MWh) is the equivalent of 1,000 kilowatts of electricity being used for one hour. The average American home uses 10,766 kilowatt hours a year (10.8 MWh; USEIA 2017c).
[2] Resulting from the lost power production from implementing operational adjustments under each alternative. CO_2 lb/MWh intensity calculated for Iowa using 2015 USEIA data: https://www.eia.gov/tools/faqs/faq.cfm?id=74&t=11; https://www.eia.gov/electricity/data/state/

Nevertheless, under any of the seven alternatives under consideration, power delivered to the grid from the 22 covered projects would not cumulatively add to the emissions produced at existing conventional power plants (Table 4.4-1 illustrates greenhouse gas emissions based on whether other sources of energy would be needed to make up lost power, but would not be emitted by operation of the wind farms themselves). Operations of the covered projects would not cause direct emissions of carbon dioxide-equivalent greenhouse gas emissions; therefore, none of the alternatives under consideration would result in greenhouse gas emissions that would contribute to problems associated with climate change.

4.4.3 Mitigation Effects

Mitigation for the covered species would not occur under the No Action Alternative; therefore, no air quality or climate impacts would occur as a result of implementation of mitigation under this alternative. Mitigation for the covered species would occur under the six action alternatives and may have a minor beneficial effect on air quality and climate by preserving and restoring woodlands, which act as a sink, absorbing carbon dioxide from the atmosphere and partially offsetting greenhouse gas emissions (USEPA 2017a). The amount of mitigation (acres of habitat protection/restoration) would vary by alternative from 768 acres to 3,200 acres, but the impacts to air quality and climate cannot be quantified at this time since the locations, sizes, and plant species composition of mitigation sites are not known but are estimated to be wholly beneficial. Specific mitigation sites will be chosen according to the criteria set forth in Section 5.3.3.3 of the HCP.

4.4.4 Mitigation for Impacts

No significant adverse effects to air quality and climate would occur as a result of operations or mitigation, regardless of which of the seven alternatives under consideration is chosen. Therefore, mitigation for air quality impacts is not warranted, and no mitigation measures would be implemented.

5.0 CUMULATIVE EFFECTS

The CEQ defines cumulative impact as:

> *"the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."* (40 CFR §1508.7).

In 1997, the CEQ published *Considering Cumulative Effects under the NEPA* as a comprehensive guidance document for cumulative analyses. The CEQ guidelines (1997b) acknowledge that while "in a broad sense all the impacts on affected resources are probably cumulative," it is important to "count what counts" and narrow the focus of the analysis to important national, regional, and local issues. While the CEQ recommends this be done through scoping, they also caution that "not all potential cumulative effects issues identified during scoping need to be included" in an EIS, but only those effects with direct influence on the project and project decision-making. The CEQ guidelines (1997b) recommend analyzing cumulative effects according to a tiered approach, which allows for a quantitative, resource-specific analysis of regional actions. Following the tiered approach recommended by the CEQ guidelines for analyzing cumulative effects, we focus our analysis on potential impacts to the following, as these are the only resources identified in Chapter 4 as having potentially significant adverse effects resulting from operations of the existing projects and mitigation for the covered species:

- Birds Not Listed Under the ESA or Protected by BGEPA
- Bald Eagles
- Bats Not Listed Under the ESA or Covered by the HCP
- Indiana bats
- Northern Long-eared Bats
- Little Brown Bats
- Tri-colored Bats

Furthermore, only bats will be affected to varying degrees by the alternatives considered in this EIS as we have assumed, based upon the available studies that operational adjustments do not affect general bird or eagle mortality. This chapter analyzes cumulative effects of the alternatives and other past, current, proposed, or reasonably foreseeable future actions on non-listed birds, bald eagles, Indiana bats, northern

long-eared bats, little brown bats, tri-colored bats, and unlisted bats. The spatial scope of analysis for non-listed birds is the two BCRs that include the 22 covered projects (Eastern Tallgrass Prairie and Prairie Potholes; see Figure 5.1-1) and for bald eagles is the Mississippi River Flyway EMU and the local area population (86-mile buffer around the 22 covered projects; see Figure 4.3-1). The spatial scope of analysis for Indiana bats is the OCRU, and for northern long-eared bats and unlisted bats, it is the Service's Region 3. The 30-year permit term is the temporal scope for all resources.

5.1 BIRDS NOT LISTED UNDER THE ESA OR PROTECTED BY BGEPA

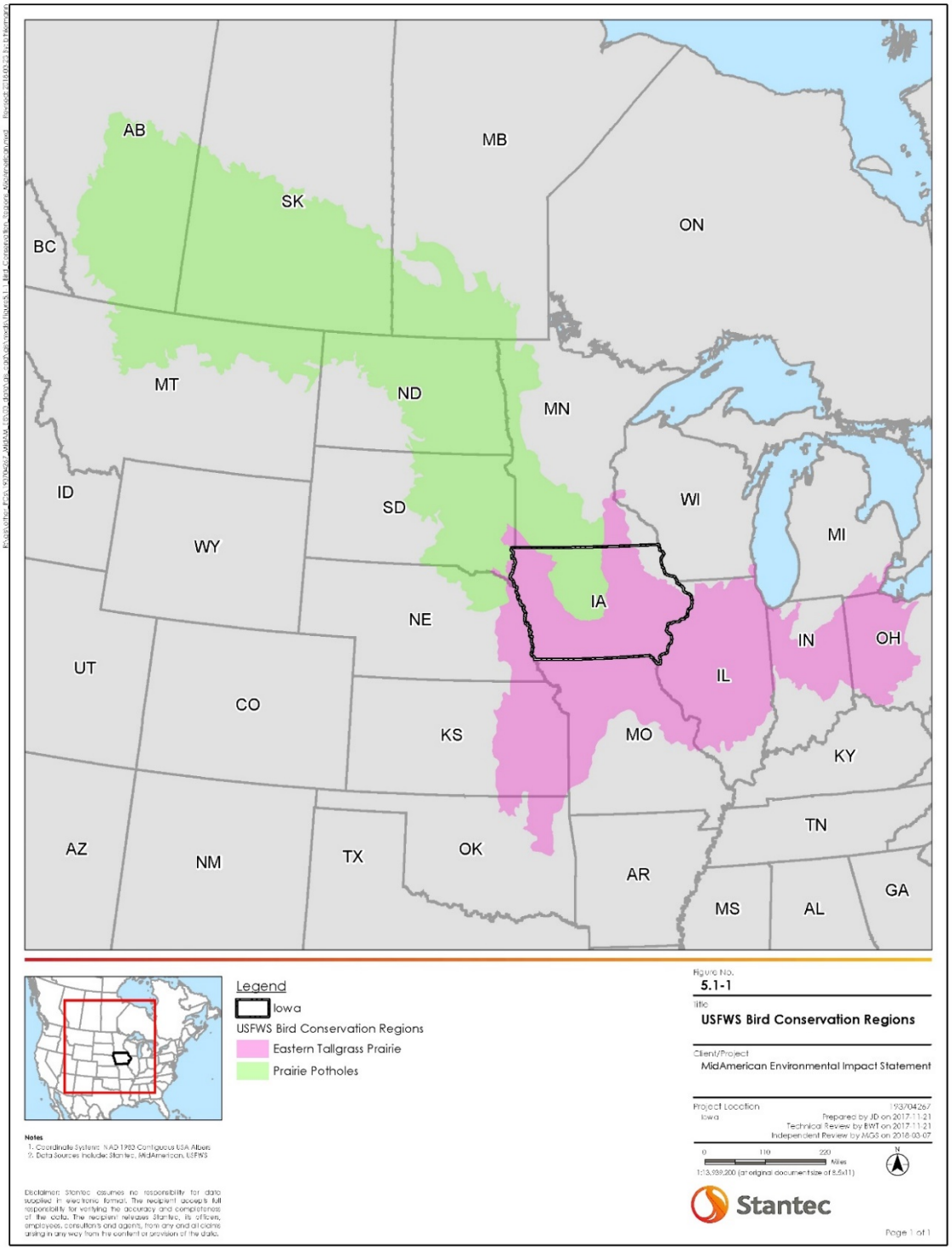
5.1.1 Geographic and Temporal Scale and Types of Impacts

Due to their extraordinary range of mobility, the cumulative effects analysis area for birds addresses potential effects within the two BCRs that include the locations of the 22 covered projects, and as such, the geographic range (and cumulative effects analysis) extends beyond the borders of the state (Figure 5.1-1).

This analysis of cumulative effects focuses on mortality of migratory birds from collisions with man-made structures including current, proposed, and projected wind energy development on birds. In addition, for decades, researchers have monitored bird mortality to some degree at other sources, such as communications towers, windows, and other tall structures. It is not surprising that wind projects would be a source of bird mortality, as stationary turbine towers and moving blades can both pose a collision risk for birds.

Mortality of 13,134 birds per year is estimated for the 22 covered projects (see Section 4.2.3.) and would be the same under any of the seven alternatives under consideration. The cumulative effects analysis for birds primarily focuses on mortality impacts attributable to the 22 covered projects in the context of other existing and planned wind facilities in the Eastern Tallgrass Prairie BCR and Prairie Potholes BCR.

Figure 5.1-1. USFWS Bird Conservation Regions



5.1.2 Wind Energy Development

The 22 covered projects fall within the boundaries of two BCRs, the Eastern Tallgrass Prairie BCR and the Prairie Potholes BCR. The Eastern Tallgrass Prairie BCR covers the majority of Iowa and extends west to portions of Nebraska and Kansas, including a small portion of Oklahoma, south to portions of Missouri, and east to Illinois, Indiana, and Ohio. The Prairie Potholes BCR extends west into South Dakota and northeastern Nebraska and northwest through Minnesota, North Dakota, northern Montana, and southern portions of Alberta, Saskatchewan, and Manitoba (Figure 5.1-1).

In 2017, there were approximately 10,957 turbines (17,859 MW) installed within the Eastern Tallgrass Prairie BCR and Prairie Potholes BCR (excluding the 2,021 existing MEC turbines). While growth in the wind sector has been rapid over the previous few years, the USEIA energy forecasts recently indicated a nationwide growth rate of 2.4 percent annually for installed wind energy capacity between 2015 and 2040 (USEIA 2015). Based upon this national average, over the 30-year permit term, it is anticipated that wind energy build-out could reach 25,702 turbines by 2049 (excluding the 2,021 existing MEC turbines) within the Eastern Tallgrass Prairie BCR and Prairie Potholes BCR. In addition, MEC will be adding up to 1,000 wind turbines as part of Wind XI. Because it is unclear whether this would have been included in the USEIA growth estimate, we conservatively added the impacts from these 1,000 wind turbines to the impacts calculated for the non-MEC turbines. MEC has announced plans for the next phase of its build-out, Wind XII, which will add 591 MW, though this phase is not yet approved by the Iowa Utilities Board and specific details are not yet available. However, we consider that Wind XII is accounted for in the projected nationwide growth rate of 2.4 percent annually.

The Eastern Tallgrass Prairie and Prairie Pothole BCRs fall within the Prairie Biome, which has an average avian fatality rate of 3.96 small birds per MW (Erickson et al. 2014). Small birds make up approximately 68% of all bird fatalities, so the overall bird fatality rate in this region is estimated at 5.82 birds per MW[41]. Applying this average to the 2017 installed capacity (17,859 MW) and adjusting for the number of turbines (10,957) results in a per-turbine fatality rate of 9.5 birds per year. Applying this average to the current non-MEC turbines in operation within the Eastern Tallgrass Prairie BCR and Prairie Potholes BCR, and adding in the impacts from the Wind XI turbines (see Table 5.1-1), results in an estimated average of 176,573 birds which may be killed annually at other wind turbines within the two BCRs. Table 5.1-1 summarizes the annual wind build-out and avian fatalities.

As discussed in Section 4.2.3.1.2, avian fatalities from the 22 covered projects is expected to be similar regardless of which alternative is chosen and is estimated at 12,664 birds per year, fleet-wide from the existing build-out. Thus, fatalities under any of the seven alternatives under consideration represents 6.5% of the estimated total bird mortality from wind energy in the Eastern Tallgrass Prairie and Prairie Potholes BCRs each year (Table 5.1-1).

[41] 3.96 birds per MW divided by 0.68 results in an all-bird fatality rate of 5.82 birds per MW.

Table 5.1-1. Summary of projected wind turbine development within the Eastern Tallgrass Prairie and Prairie Potholes BCRs over the 30-year permit term, as well as corresponding avian fatalities.

Year	Non-covered Turbines[1]	Avian Fatalities at Non-covered Turbines[2]	Total Avian Fatalities (including 12,664 annual fatalities at covered projects)	Percent Contribution to Avian Fatalities due to the 22 Covered Projects
2017[3]	10,957	104,092	116,756	11.2%
2018[3]	11,437	108,25865	120,922	10.9%
2019	12,172	114,271	126,935	10.3%
2020	12,914	120,353	133,017	9.9%
2021	13,248	123,526	136,190	9.6%
2030	16,644	155,788	168,452	7.8%
2040	21,373	200,714	213,378	6.1%
2047	25,417	239,132	251,796	5.2%
2048	26,052	245,164	257,828	5.1%
2049	26,702	251,339	264,003	5.0%
Average[3]	18,829	176,573	189,237	7.3%
Total[3]	n/a	5,473,759	5,866,343	6.5%[4]

[1] Based upon 10,957 turbines in 2017 and a 2.4% annual growth. Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek, Prairie], and 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Avian fatalities are based on a rate of 7.21 birds/turbine for the Wind XI turbines (based on MEC-specific post-construction monitoring, see Section 3.3.2.2.2) and 9.5 birds/turbine for the remaining turbines (Erickson et al. 2014).
[3] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[4] Total avian fatalities at the 22 covered projects (379,920 total) as a percent of the total avian fatalities killed at wind projects (5,866,343 total).

In order to consider potential bird mortality at wind projects over the life of the permit, it was necessary to examine the projected growth of wind power construction and operation over the next 30 years. Applying the average bird mortality rate (9.5 birds/turbine/year) to the expected level of build-out over 30 years (2.4% annual growth), plus the impacts of the Wind XI projects (see Table 5.1-1), results in an additional estimated 251,339 total birds killed annually at wind energy facilities other than the 22 covered projects across the Eastern Tallgrass Prairie and Prairie Potholes BCRs at the end of the permit term in 2049. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 189,237 birds may be killed in the Eastern Tallgrass Prairie and Prairie Potholes BCRs each year for the next 30 years, for an overall estimated total of 5,866,343 birds killed in the two BCRs during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute a total of approximately 379,920 birds, or approximately 6.5% of the overall mortality of birds at wind energy facilities within the Eastern Tallgrass Prairie and Prairie Potholes BCRs over the next 30 years, though there is no change from the current conditions as the projects are already built and operating. Compared to other anthropogenic sources of avian mortality (see Section 5.1.3 below), the effect of avian mortality at wind energy facilities in the Eastern Tallgrass Prairie and Prairie Potholes BCRs is expected to be minor and unlikely to cause population level effects (see Table 5.1-1).

5.1.3 Anthropogenic Sources of Avian Mortality Other Than Wind Farms

Many sources of mortality can affect birds, including predation by feral and domestic cats, poisoning from pesticide use and other hazardous materials releases, electrocution, and mortality due to collisions with human-made obstacles such as aircraft, vehicles, buildings, high tension lines, and communication towers. It is expected that impacts to birds from these sources of mortality would generally remain the same for the foreseeable future.

Table 5.1-2 provides annual mortality levels of birds due to anthropogenic sources in the United States. The national level is not the cumulative effects analysis area selected for birds in this EIS, but similar estimates at the BCR-level are not available.

Table 5.1-2. Estimated annual avian mortality from anthropogenic causes in the United States.

Mortality source	Estimated annual mortality	Estimated Mortality over the 30-year Permit Term
Depredation by domestic cats	1.4–3.7 billion	42 to 111 billion
Collisions with buildings (including windows)	97 million -1.2 billion	2.9 to 36 billion
Collisions with power lines	130-174 million	3.9 to 5.2 billion
Legal harvest	120 million	3.6 billion
Automobiles	50-100 million	1.5 to 3 billion
Pesticides	67-72 million	2 to 2.1 billion
Communication towers	4-50 million	120 million to 1.5 billion
Oil pits	1.5-2 million	45 to 60 million
Wind turbines	20,000-440,000	600,000 to 13.2 million
Total mortality	1.9-5.2 billion	57 to 156 billion

Sources: USFWS (2002), Erickson et al. (2005), Thogmartin et al. (2006), Dauphiné and Cooper (2009), Manville (2009), Loss et al. (2013).

5.1.3.1 Depredation by Domestic Cats

There are an estimated 117 to 157 million outdoor cats within the United States (both feral and free-ranging domestic), which are estimated to kill at least 1 billion birds each year (Dauphiné and Cooper 2009). Other studies suggest that avian fatality from outdoor cats may be even higher, between 1.4 and 3.7 billion birds per year (Loss et al. 2013). Cat predation is considered the most significant anthropogenic source of bird mortality in the United States (Dauphiné and Cooper 2011) and poses a significant threat to rare, threatened, and endangered birds (Butchart et al. 2006).

5.1.3.2 Collisions with Buildings

Bird fatalities associated with buildings are typically the result of collision with windows. There were an estimated 5.5 million commercial buildings in 2012, and more than 132 million residential housing units existed in the United States in 2013 (USEIA 2017d; U.S. Census Bureau 2013). Studies of bird collisions with buildings have concluded various mortality estimates, though all conclude that millions of avian

fatalities are attributable to building collisions per year. Loss et al. (2014) estimate that between 365 and 988 million birds (median 599 million) are killed annually by building collisions in the United States. The vast majority of avian collisions with buildings and windows involve passerines (i.e., songbirds). A study of avian collisions indicated that avian fatalities range from 0.65 to 7.7 birds per residential house per year and 733 birds per building per year (Erickson et al. 2005). Estimates of collisions with buildings and windows suggest a range of 97 million to 1.2 billion bird deaths per year (Erickson et al. 2005; Thogmartin et al. 2006). Collisions with other tall structures, such as smoke stacks, are estimated to result in tens to hundreds of thousands of collisions.

5.1.3.3 Collisions with Power Lines

There are millions of miles of power lines of various sizes, which transmit energy from where it is generated to where it is used (USFWS 2016c). In general, avian collision and electrocution mortality at power transmission and distribution lines are not systematically monitored or are subject to observational biases. The species composition of birds involved in power line collisions is largely dependent on location. For example, power lines located in wetlands have resulted in collisions of mainly waterfowl and shorebirds, while power lines located in uplands and away from wetlands have resulted in collisions of mainly raptors and passerines (Erickson et al. 2005; Manville 2005). Raptors, particularly eagles, are most commonly reported for collision or electrocution with transmission or distribution lines in the United States (Manville 2005). Collision estimates range from hundreds of thousands to 175 million birds annually, and estimates of electrocutions range from tens to hundreds of thousands of birds annually.

5.1.3.4 Legal Harvest

An estimated 120 million game birds are legally harvested by hunters each year in the United States (Banks 1979 as cited in Thogmartin et al. 2006). State and federal wildlife managers census waterfowl and monitor harvests annually. These data are used to regulate harvest levels through season lengths and bag limits, such that hunting does not contribute to population declines.

5.1.3.5 Automobiles

Vehicle strikes are estimated to result in 50 million to 100 million avian fatalities per year, and airplane strikes are estimated at over 28,500 avian fatalities per year (Erickson et al. 2005; Thogmartin et al. 2006). Numbers and species involved in vehicle collisions are dependent on habitat and geographical location, whereas the majority of airplane strikes are gulls, waterfowl, and raptors (Erickson et al. 2005).

5.1.3.6 Pesticides

As of 2012, there were approximately 389.7 million acres of cropland in the United States, with pesticides applied to 247.8 million acres (United States Department of Agriculture [USDA] 2014). This value is based on the agricultural census (USDA 2014) and does not include those acres treated with pesticides associated with other commercial uses (e.g., utility corridors, forest management, golf courses) or residential use. One study indicated that there are 0.1 to 3.6 avian fatalities per acre of pesticide-treated

cropland (Mineau 1988 as cited by Erickson et al. 2005). In total, an estimated 67.2 to 72 million birds die from exposure to pesticides each year (USFWS 2002).

5.1.3.7 Communication Towers

Avian collisions with communication towers in the United States present a significant source of annual mortality, particularly for nocturnally migrating songbirds, namely warblers, vireos, and thrushes (Erickson et al. 2005). The number of communication towers in the United States may have been as high as 200,000 towers in 2005, with 5,000 to 10,000 new towers being built each year (Erickson et al. 2005). Cellular, radio, and television towers range in height from less than 100 ft to over 2,000 ft (Kerlinger 2000). Collisions occur throughout the year but are most frequent during migration periods. Studies indicate fatality rates are highest at taller, guyed towers (Gehring et al. 2009, 2011). Data associate higher collision rates at pulsating beacons and steady burning FAA obstruction red lighting as compared to towers lit only with flashing or white-strobe beacons (Erickson et al. 2005; Gehring et al. 2009, 2011). During nights with fog or low, cloud-ceiling heights, researchers believe nocturnal migrants become disoriented by strobe or steady burning lights on towers (Erickson et al. 2005). Estimates of mean annual collisions per tower have ranged from 82 birds per year at an 825-ft tower in Alabama to 3,199 birds per year at a 1,000-ft tower in Wisconsin (Erickson et al. 2005). Mortality estimates range from 4 to 5 million to 40 to 50 million birds per year in the United States and involve over 230 species (Kerlinger 2000; Shire et al. 2000; Erickson et al. 2005; Manville 2005; Thogmartin et al. 2006).

5.1.4 Climate Change

Over half of the 588 North American bird species studied in a recent report by the Audubon Society (Audubon) are likely to be impacted by climate change, losing more than half of their current geographic range (Audubon 2015). These species can be affected not only by a changing climate but also by secondary factors, such as changing habitat, sea level rise, changes in predation, competition, and dispersal, and migratory changes (Audubon 2015). While some species (188 out of the 588; 32%) may experience habitat loss coupled with the potential to colonize new areas, other species (126 out of 588; 21%) may experience only habitat loss, with no potential for range expansion (Audubon 2015).

Within Iowa, the IDNR has predicted that breeding birds in the state will be impacted by climate change in various ways, from stable or increasing populations to population decreases, depending on the species (IDNR 2015). However, in reality, a higher percentage of the birds assessed will likely be vulnerable to climate change due to the threats they face outside of Iowa during different parts of their life cycle (IDNR 2015).

None of the seven alternatives under consideration would increase climate change; instead, all seven alternatives are expected to have a beneficial impact to the cumulative effects of climate change by reducing greenhouse gas emissions through the production of electricity via wind energy (i.e., a reduction in the amount of fossil fuels used to produce electricity). The difference in effects between the alternatives, or from current operations, is small relative to the overall beneficial effect for each alternative.

The mortality of 12,664 birds per year from the 22 covered projects would be spread across multiple species. The impacts of climate change on birds may be severe for some species in certain geographic regions, which would make additional mortality from other sources, such as wind energy facilities, more significant.

5.1.5 Habitat Loss and Fragmentation

In the Midwest, avian resources have experienced impacts due to, among others, land conversion (habitat loss) associated with oil and gas development, urbanization, agriculture, and residential development. All of these activities are likely to continue into the reasonably foreseeable future. Most of these land conversion activities often include extensive road networks.

Agriculture activities, urbanization, and residential development convert habitat for the length of time that the development is maintained. Development that results in pavement (asphalt, concrete) results in an extreme conversion of habitat with a very slow recovery rate unless pavement is removed. Conversely, some active agricultural lands may become inactive and revert to native habitats within the 30-year permit term.

Operation of the 22 covered projects would not result in additional permanent habitat loss, as impacts will be limited to temporary disturbance of previously disturbed areas and may even create forested habitat through efforts to mitigate impacts to bats and eagles. Therefore, the 22 covered projects are not expected to contribute to any incremental cumulative effects of forested habitat loss.

Reasonably foreseeable future actions within the 22 covered project areas for the next 30 years that will affect avian resources include low-density development for residences and continued conversion of non-cropped land to row crop production. This will largely affect those birds that are likely to use agricultural lands.

5.1.6 Summary of Cumulative Effect to Birds

The Service acknowledges that bird mortality at wind projects does contribute to overall avian mortality. Compared to other anthropogenic sources of avian mortality (see Table 5.1-2), the effect of avian mortality at wind energy facilities is minor.

None of the alternatives under consideration is expected to cause naturally occurring populations of common birds to be reduced to numbers below levels for maintaining viability at local or regional levels. As the 22 covered projects are already built and operating, none of the alternatives will result in substantial losses or degradation of habitat for rare, threatened, or endangered animal species or substantial changes in habitat conditions producing indirect effects that would cause naturally occurring avian populations to be reduced in numbers below levels for maintaining viability at local or regional levels.

Project mortality will contribute cumulatively to other causes of mortality, specifically wind projects and other anthropogenic sources as described above. Less than 0.1% of all anthropogenic bird mortality is

attributed to wind projects (Table 5.1-2). The Service finds that this amount of bird mortality is not likely to result in population-level impacts to any bird species. A BBCS would be implemented under any of the seven alternatives and includes a monitoring plan and adaptive management framework designed to monitor bird mortality and respond to significant events should they occur.

5.2 EAGLES

5.2.1 Geographic and Temporal Scale and Types of Impacts

The cumulative effects analysis area for bald eagles addresses potential effects at two geographic scales – the Mississippi River Flyway EMU and the local area (86-mile buffer around the 22 covered projects). This analysis largely focuses on the cumulative effects of current, proposed, and projected wind energy development on bald eagles, as well as some of the other major anthropogenic sources of bald eagle mortality. For an overview of fatality sources for bald eagles, see the Programmatic EIS for the Eagle Rule Revision (USFWS 2016c).

Mortality of up to 10 bald eagles per year is estimated for the 22 covered projects (see Section 4.3.2.1) and would be the same under any of the seven alternatives under consideration. Below is a discussion of the impacts of wind energy development over the 30-year permit term, as well as a brief summary of the top anthropogenic sources of bald eagle mortality.

5.2.2 Wind Energy Development

5.2.2.1 Mississippi River Flyway Eagle Management Unit

The 22 covered projects fall within the Mississippi River Flyway EMU, which includes the states of Minnesota, Iowa, Missouri, Arkansas, Louisiana, Wisconsin, Illinois, Michigan, Indiana, Ohio, Kentucky, Tennessee, Mississippi, and Alabama. The Mississippi River Flyway EMU has an estimated population of 31,706 eagles (USFWS 2016c). The Service has set a sustainable take threshold of 5% of the population, or 1,585 bald eagles per year.

In 2017, there were approximately 9,939 turbines installed within the Mississippi River Flyway EMU (excluding the 2,021 MEC turbines; AWEA 2017a). Based upon the 2.4% annual growth of wind energy (USEIA 2015), over the 30-year permit term, it is anticipated that wind energy build-out could reach 23,529 turbines (excluding the 2,021 existing MEC turbines) within the Mississippi Flyway EMU by 2049. In addition, MEC will be adding up to 1,000 wind turbines as part of Wind XI. Because it is unclear whether this would have been included in the USEIA growth estimate, we conservatively added the impacts from these 1,000 wind turbines to the impacts calculated for the non-MEC turbines.

Results from post-construction monitoring and eagle use surveys at covered MEC projects suggest that bald eagle fatalities could average as high as 0.005 bald eagle per turbine per year. Applying this same rate to the non-MEC turbines in the Mississippi Flyway EMU, as well as to the Wind XI turbines, results in an estimated average of 86 additional bald eagles which may be killed annually at wind turbines other

than those at the 22 covered projects within the EMU. Table 5.2-1 summarizes the annual wind build-out over 30 years and corresponding bald eagle fatalities.

Table 5.2-1. Summary of projected wind turbine development within the Mississippi River Flyway EMU over the 30-year permit term, as well as corresponding bald eagle fatalities. The 22 covered projects would contribute 10 bald eagles per year.

Year	Non-covered Turbines[1]	Bald Eagle Fatalities at Non-covered Turbines[2]	Total Bald Eagle Fatalities (non-covered turbines plus the 10 per year at the Covered Projects)	Percent Contribution to Bald Eagle Fatalities due to the 22 Covered Projects
2017[3]	9,939	50	60	16.7%
2018[3]	10,395	52	62	16.1%
2019	11,105	56	66	15.1%
2020	11,821	59	69	14.5%
2030	15,259	76	86	11.6%
2040	19,618	98	108	9.3%
2047	23,345	117	127	7.9%
2048	23,930	120	130	7.7%
2049	24,529	123	133	7.5%
Average[3]	17,272	86	96	10.8%
Total[3]	n/a	2,678	2,988	10.0%[4]

[1] Based upon 9,939 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Bald eagle fatalities are based on a rate of 0.005 bald eagle/turbine/year for all turbine build-out.
[3] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[4] Total bald eagle fatalities at the 22 covered projects (300 total) as a percent of the total bald eagle fatalities killed at wind projects (2,988 total).

As discussed in Section 4.3.2.1.2.2, bald eagle fatalities from the 22 covered projects are expected to be similar regardless of which alternative is chosen and is estimated at 10 bald eagles per year, fleet-wide. Thus, take under any of the seven alternatives under consideration would contribute 10.0% of the total bald eagle mortality from wind energy in the Mississippi Flyway EMU over the 30-year permit term, or 7.5% to 15.1% annually depending on the year (Table 5.2-1).

Applying the MEC average bald eagle mortality rate (0.005 bald eagle/turbine/year) to the expected level of build-out over 30 years (assuming 2.4% annual growth) results in an estimated 123 bald eagles killed annually by the end of the 30-year permit term at other wind energy facilities (excluding the 22 covered projects) across the Mississippi Flyway EMU. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 96 bald eagles may be killed in the Mississippi Flyway EMU each year for the next 30 years, for an overall estimated total of 2,988 bald eagles killed in the EMU during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute a total of approximately 300 bald eagles, or approximately 10.0%, of the overall

mortality of bald eagles at wind energy facilities within the Mississippi River Flyway EMU over the next 30 years.

Take within the Mississippi Flyway EMU would total 66 to 133 bald eagles per year, which would represent a take of 0.21% to 0.42% of the current bald eagle population (31,706 bald eagles; USFWS 2016c), which still falls below the 5% threshold established by the Service. For this reason, bald eagle mortality from wind energy facilities in the Mississippi Flyway EMU is not expected to cause population level effects.

5.2.2.2 Local Area Population

To determine the local area population for MEC, an 86-mi. buffer was placed around the 22 covered projects (the natal dispersal distance for bald eagles; USFWS 2016c), which results in a total area of approximately 84,874 square miles (Figure 4.3-1). The density of bald eagles within the Mississippi River Flyway is estimated at 0.045 eagle per square mile, resulting in a bald eagle population estimate of 3,819 bald eagles within the local area. The Service analyzed internal data from within the local area (an 86-mi. buffer around the 22 covered projects) and found records of 291 unpermitted bald eagle fatalities from 1950 through 2017, including 7 mortalities from wind turbine fatalities, in addition to the 6 known fatalities from MEC's existing buildout.

In 2017, there were approximately 4,537 turbines installed within this local area (excluding the 2,021 MEC turbines; AWEA 2017a). Based upon the 2.4% annual growth of wind energy (USEIA 2015), over the 30-year permit term, it is anticipated that wind energy build-out could reach 12,984 turbines (excluding the 2,021existing MEC turbines) within the local area by 2049. In addition, MEC will be adding up to 1,000 wind turbines as part of Wind XI. Because it is unclear whether this would have been included in the USEIA growth estimate, we conservatively added the impacts from these 1,000 wind turbines to the impacts calculated for the non-MEC turbines.

Results from post-construction monitoring and eagle use surveys at covered MEC projects suggest that bald eagle fatalities could average as high as 0.005 bald eagle per turbine per year. Applying this same rate to the non-MEC turbines in the local area (86-mile buffer, Figure 4.3-1), as well as the bald eagles which would be killed at Wind XI turbines, results in an estimated average of 45 bald eagles which may be killed annually at other wind turbines within the local area. Table 5.2-2 below summarizes the annual wind build-out over 30 years and corresponding bald eagle fatalities.

Table 5.2-2. Summary of projected wind turbine development within the local area (86-mile buffer around the 22 covered projects, see Figure 4.3-1) over the 30-year permit term, as well as corresponding bald eagle fatalities. The 22 covered projects would contribute 10 bald eagles per year.

Year	Non-covered Turbines[1]	Bald Eagle Fatalities at Non-covered Turbines[2]	Total Bald Eagle Fatalities (non-covered turbines plus the 10 per year at the Covered Projects)	Percent Contribution to Bald Eagle Fatalities due to the 22 Covered Projects (10 per year)
2017[3]	4,537	23	33	30.3%
2018[3]	4,863	24	34	29.4%
2019	5,440	27	37	27.0%
2020	6,020	30	40	25.0%
2030	7,903	40	50	20.0%
2040	10,291	51	61	16.4%
2047	12,335	62	72	13.9%
2048	12,656	63	73	13.7%
2049	12,984	65	75	13.3%
Average[3]	8,574	45	55	18.9%
Total[3]	n/a	1,396	1,706	17.6%[4]

[1]Based upon 4,537 turbines in 2017 and a 2.4% annual growth rate. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2]Bald eagle fatalities are based on a rate of 0.005 bald eagle/turbine/year for all turbine build-out.
[3]The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[4]Total bald eagle fatalities at the 22 covered projects (300 total) as a percent of the total bald eagle fatalities killed at wind projects (1,706 total).

As discussed in Section 4.3.2.1.2.2, bald eagle fatalities from the 22 covered projects are expected to be similar regardless of which alternative is chosen (as the minimization measures for bald eagles are the same under all alternatives) and is estimated at 10 bald eagles per year, fleet-wide. Thus, take under any of the seven alternatives under consideration would contribute 17.6% to the total bald eagle mortality from wind energy in the local area over the 30-year permit term, or 13.3% to 27.0% annually depending on the year (Table 5.2-2).

Applying the MEC average bald eagle mortality rate (0.005 bald eagle/turbine) to the expected level of build-out over 30 years results in an estimated 60 bald eagles killed annually by the end of the 30-year permit term at other non-MEC wind energy facilities across the local area, plus 5 mortalities attributed to the Wind XI projects, plus the 10 fatalities at the covered projects, for a total of 75 bald eagles killed annually by 2049. Although the number of installed wind turbines would change each year, assuming 2.4% growth each year, an estimated average of 55 bald eagles may be killed in the local area each year for the next 30 years, for an overall estimated total of 1,706 bald eagles killed in the local area during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute a total of

approximately 300 bald eagles, or approximately 17.6%, of the overall mortality of bald eagles at wind energy facilities within the local area over the next 30 years.

Take within the local area (including non-MEC take, Wind XI, and the 22 covered projects) would total 37 to 75 bald eagles per year, which would represent a take of 0.97% to 1.96% of the current bald eagle population (3,819 bald eagles; USFWS 2016c), which still falls below the 5% threshold established by the Service. For this reason, bald eagle mortality from wind energy facilities in the local area is not expected to cause population level effects.

5.2.3 Anthropogenic Sources of Eagle Mortality Other Than Wind Farms

A recent study was conducted looking at the cause of death of 2,980 bald eagles submitted to the National Wildlife Health Center between 1975 and 2013 (Russell and Franson 2014). The carcasses came from throughout the United States, but the highest number came from the Mississippi River flyway (915 carcasses, or 30.7%; Russell and Franson 2014). The most common causes of death for bald eagles were poisoning, trauma, electrocution, and shooting (Table 5.2-3).

Table 5.2-3. Summary of causes of death in bald eagles submitted to the National Wildlife Health Center between 1975 and 2013 (Russell and Franson 2014).

Cause of Death	Number	Percentage
Poisoning	762	25.6%
Trauma	681	22.9%
Electrocutions	372	12.5%
Shooting	303	10.2%
Undetermined	298	10.0%
Emaciation	176	5.9%
Other[1]	163	5.5%
Disease	155	5.2%
Trapped	59	2.0%
Drowned	11	0.4%
Total	2,980	100%

[1]"Other" includes a wide variety of diagnoses, including inflammation, bumblefoot, gangrene, deformity, hemorrhage, edema, atherosclerosis, etc. (Russell and Franson 2014).

In addition, the Service analyzed internal data from within the local area (an 86-mi. buffer around the 22 covered projects, see Section 4.3.2.1.1.2 and Figure 4.3-1) and found records of 291 unpermitted bald eagle fatalities from 1950 through 2017. The most common known causes were shootings (44 fatalities, or 15.1%), lead poisoning (38 fatalities, or 13.1%), trauma (24 fatalities, or 8.2%), electrocution (23 fatalities, or 7.9%), and pesticide poisoning (15 fatalities, or 5.2%).

The most common causes of death for bald eagles were all anthropogenic sources (poisoning, trauma, electrocution, and shooting), which are all described in detail below. It is expected that impacts to eagles from these sources of mortality would generally remain the same for the foreseeable future.

5.2.3.1 Poisoning

Poisoning of bald eagles was the most common cause of death (Table 5.2-3), and among poison types[42], lead poisoning was the most common, occurring in 63.5% of cases (Russell and Franson 2014). The next most common poison type was organophosphates, which accounted for 12.5% of cases (Russell and Franson 2014). Thus, this analysis will focus on lead poisoning.

Lead poisoning cases are significantly higher after autumn, coinciding with the deer hunting season (Russell and Franson 2014). It has been suggested that the overall significance of lead poisoning in wildlife is underestimated due to sublethal effects that are likely to go undetected (Hunt 2012), though Russell and Franson (2014) did not find elevated levels of lead in eagles killed by other sources. Of lead-poisoned bald eagles, 51% came from only seven states, including Alaska, Arkansas, Iowa, Florida, Minnesota, Missouri, and Wisconsin (Russell and Franson 2014). A separate study of 58 bald eagles in Iowa, Minnesota, and Wisconsin found that 60% had detectable lead concentrations, and 38% were within the lethal range (Warner et al. 2014). Furthermore, of offal piles (organs and entrails) studied within the USFWS Upper Mississippi River National Wildlife and Fish Refuge, 36% contained lead fragments, ranging from 1 to 107 particles per pile (Warner et al. 2014).

A study in Wyoming found that 24% of bald eagles tested positive at clinical exposure levels for lead during the big game hunting season, compared to none outside of the hunting season (Bedrosian et al. 2012).

5.2.3.2 Trauma

Traumatic injuries in eagles can include vehicular collision, collision with power lines or power poles, or aggressive encounters with other raptors or eagles (Thomas 2008).

Bald eagles can be attracted to road kill as a source of carrion, increasing their likelihood of being struck by a motor vehicle (Russell and Franson 2014). The Service reported that, in Michigan, vehicular collisions were responsible for 29% of eagle mortalities between 1987 and 2008 (USFWS 2010). Most vehicular bald eagle collisions in Wisconsin occur when eagles are scavenging car-killed deer (Wisconsin DNR 2011).

5.2.3.3 Electrocutions

Bald eagle electrocutions between 1975 and 2013 were less than 15% of reported moralities nation-wide and less than 10% for bald eagles in the Mississippi flyway (Russell and Franson 2014). Between 1975 and 1997, 11-20 eagles were diagnosed as electrocuted in Iowa, and electrocution of eagles tends to be more common in the western states where open shrub and grassland habitats are common (United States Geological Survey [USGS] 1999).

[42] Identified poison types included 1080, brodifacoum, barbiturate, carbamate, lead, dieldrin, organophosphate, strychnine, thallium, cyanide, and heptachlor epoxide (Russell and Franson 2014).

5.2.3.4 Shooting

The shooting of a bald eagle is illegal under BGEPA (see Section 1.3.3), yet it is still responsible for approximately 10% of all fatalities (Table 5.2-3). This can include accidental shootings due to mistaken identity, though that is not always the case, and poaching or other causes cannot be ruled out (Coon et al. 1969).

5.2.4 Climate Change

While climate change itself does not cause mortality of bald eagles, it is likely to exacerbate existing threats (e.g., invasive plants, disease, habitat loss) and may also alter migration routes, breeding territories, and wintering habitat (USFWS 2016c).

None of the seven alternatives under consideration would contribute to climate change; instead, all seven alternatives are expected have a beneficial impact to the cumulative effects of climate change by reducing greenhouse gas emissions through the production of electricity via wind energy (i.e., a reduction in the amount of fossil fuels used to produce electricity). The difference in effects between the alternatives, or from current operations, is small relative to the overall beneficial effect for each alternative.

The impact of climate change on bald eagle populations has the potential to be severe, which would make additional mortality from other sources, such as wind energy facilities, more significant. However, given the estimated mortality of 10 bald eagles per year from the 22 covered projects and the beneficial effects of the projects on climate change, as well as the 30-year permit term, it is not anticipated that bald eagle mortality from the 22 covered projects will add significantly to the cumulative effects of climate change.

5.2.5 Habitat Loss and Fragmentation

Habitat loss and fragmentation in the contiguous United States is a concern for population stability and can be due to climate change, invasive vegetation, wildfires, energy development, housing development, agricultural transition, increased livestock presence, recreation, and roadway construction/highway expansion (USFWS 2016c). Bald eagles are able to tolerate some levels of anthropogenic presence (Buehler 2000), and populations have increased since the 1960s despite habitat loss (USFWS 2016c).

Operation of the 22 covered projects would not result in additional permanent habitat loss, as impacts will be limited to temporary disturbance of previously disturbed areas, and may even create forested habitat through efforts to mitigate impacts to bats and eagles. Therefore, the 22 covered projects are not expected to contribute to any incremental cumulative effects of habitat loss.

5.2.6 Summary of Cumulative Effect to Eagles

The Service acknowledges that eagle mortality at wind projects does contribute to overall eagle mortality and may contribute to other anthropogenic sources of bald eagle mortality (see Table 5.2-3), potentially increasing the rate of trauma mortality.

None of the alternatives under consideration is expected to cause populations of bald eagles to be reduced to numbers below levels for maintaining viability at local or regional levels (based upon a 5% additional mortality rate being sustainable). As the 22 covered projects are already built and operating, none of the alternatives will result in substantial losses or degradation of habitat for bald eagles or substantial changes in habitat conditions producing indirect effects that would cause naturally occurring bald eagle populations to be reduced in numbers below levels for maintaining viability at local or regional levels.

Project mortality will contribute cumulatively to other causes of mortality, specifically wind projects and other anthropogenic sources as described above. However, based on the rates of take from wind energy at both the EMU and LAP levels, which fall below the 5% sustainability threshold, the Service finds that this amount of mortality is not likely to result in population-level impacts to bald eagles.

5.3 BATS (INCLUDING COVERED AND NON-COVERED SPECIES)

5.3.1 Geographic and Temporal Scale and Types of Impacts

Many sources of mortality can affect bats, including mortality due to collisions with human-made obstacles, such as lighthouses, communication towers, aircraft, and buildings (Johnson et al. 2004; Peurach et al. 2009). It is expected that impacts to bats from these sources of collision mortality would generally remain the same for the foreseeable future. Therefore, this section focuses on new and foreseeably increasing sources of mortality for the covered species (Indiana bat, northern long-eared bat, little brown bat, tri-colored bat) and non-listed and non-covered bat species. For the purposes of this EIS, the cumulative effects analysis area for Indiana bats is the OCRU, which includes the range of the Indiana bat within Iowa, Illinois, Missouri, Arkansas, and Oklahoma. The cumulative effects analysis area for the remaining bat species is the USFWS Region 3. The cumulative effects analysis used a 30-year timeframe based on the requested duration for the ITP. The selected spatial and temporal scales provide a reasonable assessment of past and potential future cumulative effects. Not enough data are available to understand what spatial scale may be appropriate for most bat species, so we have chosen Region 3 as the best available and most reasonable spatial scale to use for all bat species for which populations have not been delineated (i.e., all species except for the Indiana bat).

The cumulative effects analysis for bats considers the effects of wind projects associated with operations and maintenance (injury and mortality). We also address three other sources of mortality, WNS, habitat loss or alteration, and climate change, which can have significant effects on bats and may accumulate over time.

5.3.2 Wind Energy Development

In 2017, there were approximately 9,939 turbines, excluding the 22 covered projects, within the Service's Region 3 (AWEA 2017b-o), and 2,906 turbines within the OCRU, excluding the 375 existing MEC turbines (AWEA 2017a). The USEIA energy forecasts recently indicated a nationwide growth rate of 2.4 percent annually for installed wind energy capacity between 2015 and 2040 (USEIA 2015). Based upon this, over the 30-year permit term, it is anticipated that wind energy build-out could reach 23,529 turbines

(excluding the 2,021 existing MEC turbines) within Region 3 and 6,640 turbines within the OCRU by 2049. In addition, MEC will be adding up to 1,000 wind turbines as part of Wind XI. Because it is unclear whether this was included in the USEIA growth estimate, we conservatively added the impacts from these wind turbines to the impacts from the non-MEC turbines.

Cumulative effects for Indiana bats are based on the 3,066 to 6,640 turbines within the OCRU, as well as the assumption that up to 965 Wind XI turbines would be placed within the range of the Indiana bat (currently, locations are only known for 169 turbines, of which 35 are outside of the Indiana bat range). For all other bat species, the cumulative effects are based on the 10,520 to 23,529 turbines within Region 3, plus the 1,000 Wind XI turbines.

5.3.2.1 Bats Not Listed Under the ESA or Covered by the HCP

Annual bat fatality within Region 3 is estimated to average 29.6 bats per turbine[43]. Based on post-construction mortality monitoring throughout Region 3, the non-listed and non-covered bat species (eastern red bat, hoary bat, silver-haired bat, big brown bat, and evening bat) would be anticipated to make up 29.1 bats per turbine[44] (USFWS 2016e). Applying this rate (29.1 bats/turbine) to the non-MEC turbines in Region 3, as well as the bats which would be killed at Wind XI turbines (28.21 bats/turbine based on MEC-specific data, see Section 3.3.2.1.2; adjusted to 30.05 bats/turbine to account for 96.9% of fatalities being non-covered species), results in an estimated average of 500,542 non-listed and non-covered bats that may be killed annually at other wind turbines within Region 3 from 2019 to 2049. As discussed in Section 4.2.2.1, bat fatalities from the 22 covered projects would depend on the alternative under which the projects are operated. It is predicted that annual mortality of all non-listed and non-covered bat species by alternative at the 22 covered projects would be as follows:

- No Action Alternative: 30,325 bats per year, or 909,750 over the 30-year permit term
- Alternative A: 21,163 bats per year, or 634,890 over the 30-year permit term
- Alternative B: 23,108 bats per year, or 693,240 over the 30-year permit term
- Alternative C: 23,328 bats per year, or 699,840 over the 30-year permit term
- Alternative D: 36,200 bats per year, or 1,086,000 over the 30-year permit term
- Alternative E: 20,606 bats per year, or 618,180over the 30-year permit term
- HCP Alternative: 33,576 bats per year, or 1,007,280 over the 30-year permit term

Therefore, take of non-listed and non-covered bats is expected to range from 20,606 bats per year under Alternative E to 36,200 bats per year under Alternative D (with the remaining 4 alternatives falling in between this minimum and maximum). Table 5.3-1 summarizes the annual wind build-out over 30 years and corresponding bat fatalities.

[43] USFWS (2016e) estimated fatality at 17.59 bats/MW. Applying this to the currently installed capacity (20,108 MW, including the 22 covered projects) and then adjusting by the number of turbines (11,960 including the 22 covered projects) results in a per turbine estimate of 29.6 bats. It is assumed that this estimate is based on freewheeling turbines that are not feathered.
[44] 48.7% eastern red bat (14.4/turbine/year), 24.2% hoary bat (7.2/turbine/year), 19.6% silver-haired bat (5.8/turbine/year), 5.3% big brown bat (1.6/turbine/year), and 0.3% evening bat (0.1/turbine/year).

Table 5.3-1. Summary of projected wind turbine development within the USFWS Region 3 over the 30-year permit term, as well as corresponding bat fatalities.

Year	Non-covered Turbines[1]	Bat Fatalities at Non-covered Turbines[2]	Total Bat Fatalities (including 20,606 to 36,200 at the covered projects, depending on alternative)	Percent Contribution to Bat Fatalities due to the 22 Covered Projects[3]
2017[3]	9,939	289,225	309,831 to 325,425	6.7% to 11.1%
2018[3]	10,395	302,655	323,261 to 338.855	6.4% to 10.7%
2019	11,105	323,710	344,316 to 359,910	6.0% to 10.1%
2020	11,821	344,940	365,546 to 381,140	5.6% to 9.5%
2030	15,259	444,986	465,592 to 481,186	4.4% to 7.5%
2040	19,618	571,833	592,439 to 608,033	3.5% to 5.9%
2047	23,345	680,289	700,895 to 716,489	2.9% to 5.0%
2048	23,930	697,312	717,918 to 733,512	2.9% to 4.9%
2049	24,529	714,743	735,349 to 750,943	2.8% to 4.9%
Average[3]	17,272	503,542	524,148 to 539, 742	3.9% to 7.0%
Total[3]	n/a	15,609,806	16,248,592 to 16,732,006	3.8% to 6.5%[4]

[1] Based upon 9,939 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Bat fatalities are based on a rate of 28.21 bats/turbine for the Wind XI turbines (based on MEC-specific post-construction monitoring, see Section 3.3.2.1.2; adjusted to 30.05 bats/turbine to account for 96.9% of fatalities being non-covered bat species) and 29.1 bats/turbine for the remaining turbines (Erickson et al. 2014).
[3] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[4] Total bat fatalities at the 22 covered projects (20,606 to 36,200 per year for 30 years) as a percent of the total bat fatalities killed at wind projects (16,248,592 to 16,732,006 total).

Take under any of the seven alternatives under consideration would contribute approximately 3.8% to 6.5% to the total potential bat mortality from wind energy in Region 3 over the 30-year permit term, or 2.8% to 11.1% annually depending on the year and alternative chosen (Table 5.3-1).

Applying the average bat mortality rate to the expected level of build-out over 30 years results in an estimated 714,743 bats killed annually by the end of the 30-year permit term at other wind energy facilities across Region 3, and 735,349 to 750,943 bats when including take from the covered projects (depending on alternative; Table 5.3-1). Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an average of 524,148 to 539,742 bats are estimated to be killed in Region 3 each year for the next 30 years, for an overall estimated total of 16,248,592 to 16,732,006 bats killed in the region during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute a total of approximately 618,180 to 1,086,000 bats, depending on the alternative

chosen, which is approximately 3.9% to 6.5% of the overall mortality of bats at wind energy facilities within Region 3 over the next 30 years.

By alternative, the 22 covered projects would contribute the following to the total bat mortality from wind energy in Region 3:

- No Action Alternative: 4.1% to 8.6% annually, or 5.5% of the 30-year totals
- Alternative A: 2.9% to 6.1% annually, or 3.9% of the 30-year totals
- Alternative B: 3.1% to 6.7% annually, or 4.3% of the 30-year totals
- Alternative C: 3.2% to 6.7% annually, or 4.3% of the 30-year totals
- Alternative D: 4.8% to 10.1% annually, or 6.5% of the 30-year totals
- Alternative E: 2.8% to 6.0% annually, or 3.8% of the 30 year totals
- HCP Alternative: 4.5% to 9.4% annually, or 6.1% of the 30-year totals

Direct mortality of over 14 million non-listed and non-covered bats over the next 30 years associated with wind energy facilities, in concert with other challenges faced by these species, could have a substantial cumulative effect on these species, including potentially substantial declines in populations (Frick et al. 2017). Other recent research has shown that eastern red bat and hoary bat populations both have large, well-connected populations and have not yet started to show genetic evidence of population declines (Korstian et al. 2015). Mortality of non-listed and non-covered bat species at the 22 covered projects is not expected to be a significant addition to the overall level of bat mortality at wind energy facilities in Region 3. With the information in hand at this time, it is unknown whether tree bat populations can be sustained under wind energy development that may cause the loss of millions of bats over the next 30 years. This analysis also assumes that turbines will be free-wheeling, and no conservation measures will be applied to non-covered turbines. If tree bat fatality rates are reduced through feathering and/or other conservation measures, it is possible that tree bat populations could be sustained under the projected wind energy development.

The actual level of bat mortality across the region may be lower, as some (though not all) wind energy facilities in Region 3 now implement at least some degree of modified turbine operations during the fall bat migration season. Additionally, a growing body of research and improved understanding of the factors affecting bat mortality risk at wind energy facilities is likely to increase the effectiveness of future turbine operational protocols at reducing bat mortality, as well as aid in siting decisions to minimize impacts on bats. If all wind energy facilities in the region followed AWEA guidelines regarding feathering below manufacturer's cut-in speed over the next 30 years, this would reduce bat mortality by 35% or more, and the cumulative impacts of wind energy development on bat species not listed under the ESA in Region 3 would be greatly reduced. We don't have sufficient information at this time to confidently estimate probable tree bat populations or likelihood of implementation of the AWEA guidelines or comparable conservation measures.

Fatalities at industrial wind facilities are heavily skewed toward the three species of migratory tree bats (hoary bats, eastern red bats, and silver-haired bats). If the build-out scenarios are implemented and the estimates based on current post-construction monitoring remain more or less the same, millions of tree

bats would die at wind facilities in Region 3 alone. Migratory tree bats have shorter life spans than other bats, but females are capable of producing multiple pups per year, as opposed to the covered species, which tend to produce a single pup each year. As such, it is reasonable to assume that these species may be capable of tolerating greater mortality than other species. Frick et al. (2017) explores various scenarios of hoary bat fatality rates in North America under several potential population sizes. The paper demonstrates that the magnitude of the impact of tree bat fatality rates is very dependent upon the population size and growth rates. Recent research has shown that eastern red bat and hoary bat populations both have large, well-connected populations, and have not yet started to show genetic evidence of population declines (Korstian et al. 2015). However, population numbers of these bats are currently unknown, and therefore the impact of taking millions of bats over the next 30-years is unknown but could be unsustainable.

5.3.2.2 Indiana Bat

Indiana bat fatality within the OCRU is estimated to average 0.027 Indiana bat per turbine[45]. Applying this rate to the non-MEC turbines in the OCRU, as well as the Indiana bats that would be killed at Wind XI turbines, results in an estimated average of 222 Indiana bats that may be killed annually at other wind turbines within the OCRU. As discussed in Section 4.3.3.1.2.2, Indiana bat fatalities from the 22 covered projects (375 turbines within the range) would depend on the alternative under which the projects are operated. It is predicted that annual mortality of Indiana bats by alternative at the 22 covered projects would be as follows:

- No Action Alternative: 0 Indiana bats per year, or 0 over the 30-year permit term
- Alternative A: 6 to 14 Indiana bats per year, or 180 to 420 over the 30-year permit term
- Alternative B: 6 to 14 Indiana bats per year, or 180 to 420 over the 30-year permit term
- Alternative C: 6 to 16 Indiana bats per year, or 180 to 480 over the 30-year permit term
- Alternative D: 10 to 25 Indiana bats per year, or 300 to 750 over the 30-year permit term
- Alternative E: 6 to 14 Indiana bats per year, or 180 to 420 over the 30-year permit term
- HCP Alternative: 9 to 25 Indiana bats per year, or 270 to 750 over the 30-year permit term

Therefore, take of Indiana bats is expected to range from 0 Indiana bats per year under the No Action Alternative to 25 Indiana bats per year under Alternative D (with the remaining 4 alternatives falling in between this minimum and maximum). Table 5.3-2 below summarizes the annual wind build-out over 30 years and the corresponding Indiana bat fatalities.

[45] USFWS (2016e) estimated fatality at 0.016 Indiana bat/MW. Applying this to the currently installed capacity (4,908 MW) and then adjusting by the number of turbines (2,906) results in a per turbine estimate of 0.027 Indiana bat.

Table 5.3-2. Summary of projected wind turbine development within the OCRU over the 30-year permit term, as well as corresponding Indiana bat fatalities.

Year	Non-Covered Turbines[1]	Indiana Bat Fatalities at Non-covered Turbines[2]	Total Indiana Bat Fatalities (including 0 to 25 per year at the covered projects)	Maximum Percent Contribution to Indiana Bat Fatalities due to the 22 Covered Projects[3]
2017[4]	2,906	78	78 to 103	24.3%
2018[4]	3,119	95	95 to 120	20.3%
2019	3,616	139	139 to 164	15.1%
2020	4,114	183	183 to 208	12.0%
2030	5,059	209	209 to 234	10.7%
2040	6,256	241	241 to 266	9.4%
2047	7,280	269	269 to 294	8.5%
2048	7,441	273	273 to 298	8.4%
2049	7,605	277	277 to 302	8.3%
Average[4]	5,602	222	222 to 247	10.3%
Total[4]	NA	6,889	6,889 to 7,664	9.8%[5]

[1] Based upon 2,906 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (134 of the turbines in 2018 [Beaver Creek and Prairie; excludes the 35 turbines outside the range of the Indiana bat at Beaver Creek], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations and assumed to all be within the range of the Indiana bat and thus represent the maximum reasonably foreseeable take).
[2] Indiana bat fatalities are based on a rate of 0.101333 bat/turbine for the Wind XI turbines (based on MEC-specific post-construction monitoring; 38 fatalities divided by the 375 turbines within the range is 0.101333 bat/turbine, see the "No Operational Adjustment Scenario" in Section 4.3.3.1.2.2) and 0.027 bat/turbine for the remaining turbines (USFWS 2016i).
[3] The percent contribution is presented as the maximum annual mortality under the seven alternatives, as the minimum would be zero for every year (No Action Alternative).
[4] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[5] Total Indiana bat fatalities at the 22 covered projects (up to 25 per year for 30 years) as a percent of the total Indiana bat fatalities killed at wind projects (7,664 total).

Take under any of the seven alternatives under consideration would contribute from 0.0% to 9.8% of the total Indiana bat mortality from wind energy in the OCRU over the 30-year permit term, or 0.0% to 15.1% annually depending on the year and alternative chosen (Table 5.3-2).

Applying the average Indiana bat mortality rate to the expected level of build-out over 30 years results in an estimated 277 Indiana bats killed annually by the end of the 30-year permit term at other wind energy facilities across the OCRU. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 222 to 247 Indiana bats are estimated to be killed in the OCRU each year for the next 30 years, for an overall estimated total of 6,889 to 7,664 Indiana bats killed in the OCRU during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute between 0 and 750 Indiana bats, depending on the alternative chosen, which is approximately 0.0% to 9.8% of the overall mortality of Indiana bats at wind energy facilities within the OCRU over the next 30 years.

By alternative, the 22 covered projects would contribute the following to the total Indiana bat mortality from wind energy in the OCRU:

- No Action Alternative: None
- Alternative A: 2.1% to 9.2% annually, or 2.5% to 5.7% of the 30-year totals
- Alternative B: 2.1% to 9.2% annually, or 2.5% to 5.7% of the 30-year totals
- Alternative C: 2.1% to 10.3% annually, or 2.5% to 6.5% of the 30-year totals
- Alternative D: 3.5% to 15.2% annually, or 4.2% to 9.8% of the 30-year totals
- Alternative E: 2.1% to 9.2% annually, or 2.5% to 5.7% of the 30-year totals
- HCP Alternative: 3.1% to 15.2% annually, or 3.8% to 9.8% of the 30-year totals

However, mitigation measures designed to fully compensate for the level of expected take and the associated loss in reproduction will be implemented as a part of the any of the action alternatives. Therefore, mortality of Indiana bats at the 22 covered projects is not expected to be a significant addition to the overall level of Indiana bat mortality at wind energy facilities in the OCRU. The loss of Indiana bats each year during the 30-year permit term is anticipated to be distributed across many maternity colonies and hibernacula. In the absence of other major threats, we would not expect this level of impact to negatively affect either the OCRU population or specific maternity or hibernating populations. However, we do not yet fully understand the impacts of WNS on Indiana bat populations in the OCRU, and the presence of the disease will likely alter the dynamics of the local population (see Section 5.3.3 for a discussion of WNS and Indiana bats).

5.3.2.3 Northern Long-Eared Bat

Northern long-eared bat fatality within Region 3 is estimated to average 0.027 northern long-eared bat per turbine[46]. Applying this rate to the non-MEC turbines in Region 3, as well as the northern long-eared bats which would be killed at Wind XI turbines, results in an estimated average of 455 northern long-eared bats which may be killed annually at other wind turbines within Region 3. As discussed in Section 4.3.3.2.2.2, northern long-eared bat fatalities from the 22 covered projects would depend on the alternative under which the projects are operated. It is predicted that annual mortality of northern long-eared bats by alternative at the 22 covered projects would be as follows:

- No Action Alternative: 7 to 17 northern long-eared bats per year, or 210 to 510 over the 30-year permit term
- Alternative A: 5 to 13 northern long-eared bats per year, or 150 to 390 over the 30-year permit term
- Alternative B: 5 to 13 northern long-eared bats per year, or 150 to 390 over the 30-year permit term
- Alternative C: 5 to 14 northern long-eared bats per year, or 150 to 420 over the 30-year permit term

[46] USFWS (2016e) estimated fatality at 0.016 northern long-eared bat/MW. Applying this to the currently installed capacity (20,108 MW) and then adjusting by the number of turbines (11,960) results in a per turbine estimate of 0.027 bats.

- Alternative D: 8 to 21 northern long-eared bats per year, or 240 to 630 over the 30-year permit term
- Alternative E: 5 to 13 northern long-eared bats per year, or 150 to 390 over the 30-year permit term
- HCP Alternative: 8 to 21 northern long-eared bats per year, or 240 to 630 over the 30-year permit term

Therefore, take of northern long-eared bats is expected to range from 5 northern long-eared bats per year under Alternatives A, B, or C to 21 northern long-eared bats per year under Alternative D (with the remaining 2 alternatives falling in between this minimum and maximum). Table 5.3-3 below summarizes the annual wind build-out over 30 years and the corresponding northern long-eared bat fatalities.

Table 5.3-3. Summary of projected wind turbine development within Region 3 over the 30-year permit term, as well as corresponding northern long-eared bat fatalities.

Year	Non-Covered Turbines[1]	Northern Long-eared Bat Fatalities at Non-covered Turbines[2]	Total Northern Long-eared Bat Fatalities (including 5 to 21 annually from the covered projects)	Percent Contribution to Northern Long-eared Bat Fatalities due to the 22 Covered Projects[3]
2017[4]	9,939	268	273 to 289	1.8% to 7.3%
2018[4]	10,395	279	284 to 300	1.8% to 7.0%
2019	11,105	293	298 to 314	1.7% to 6.7%
2020	11,821	308	313 to 329	1.6% to 6.4%
2030	15,259	401	406 to 422	1.2% to 5.0%
2040	19,618	519	524 to 540	1.0% to 3.9%
2047	23,345	619	624 to 640	0.8% to 3.3%
2048	23,930	635	640 to 656	0.8% to 3.2%
2049	24,529	651	656 to 672	0.8% to 3.1%
Average[4]	17,272	455	460 to 476	1.1% to 4.6%
Total[4]	n/a	14,120	14,275 to 14,771	1.1% to 4.3%[5]

[1] Based upon 9,939 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Northern long-eared bat fatalities are based on a rate of 0.016 northern long-eared bat/turbine/year for the Wind XI turbines (based on MEC-specific post-construction monitoring data; 33 northern long-eared bats divided by 2,021 turbines is 0.016 northern long-eared bat/turbine; see "No Operational Adjustment" in Section 4.3.3.2.1.2) and a rate of 0.027 northern long-eared bat/turbine/year for the remaining turbines (USFWS 2016i).
[3] The percent contribution is presented as a range based on the minimum and maximum annual mortality under the seven alternatives.
[4] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[5] Total northern long-eared bat fatalities at the 22 covered projects (5 to 21 per year for 30 years) as a percent of the total northern long-eared bat fatalities killed at wind projects (14,275 to 14,771 total).

Take under any of the seven alternatives under consideration would contribute from 1.1% to 4.3% of the northern long-eared bat mortality from wind energy in Region 3 over the 30-year permit term, or 0.8% to 6.7% annually depending on the year and alternative chosen (Table 5.3-3).

Applying the average northern long-eared bat mortality rate to the expected level of build-out over 30 years results in an estimated 651 northern long-eared bats killed annually by the end of the 30-year permit term at other wind energy facilities across Region 3. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 460 to 476 northern long-eared bats are calculated to be killed in Region 3 each year for the next 30 years, for an overall estimated total of 14,275 to 14,771 northern long-eared bats killed in Region 3 during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute between 5 and 21 northern long-eared bats annually, depending on the alternative chosen, which is approximately 1.1% to 4.3% of the overall mortality of northern long-eared bats at wind energy facilities within Region 3 over the next 30 years.

By alternative, the 22 covered projects would contribute the following to the total northern long-eared bat mortality from wind energy in Region 3:

- No Action Alternative: 1.1% to 5.5% annually, or 1.5% to 3.5% of the 30-year totals
- Alternative A: 0.8% to 4.2% annually, or 1.1% to 2.7% of the 30-year totals
- Alternative B: 0.8% to 4.2% annually, or 1.1% to 2.7% of the 30-year totals
- Alternative C: 0.8% to 4.6% annually, or 1.1% to 2.9% of the 30-year totals
- Alternative D: 1.2% to 6.7% annually, or 1.7% to 4.3% of the 30-year totals
- Alternative E: 0.8% to 4.2% annually, or 1.1% to 2.7% of the 30-year totals
- HCP Alternative: 1.2% to 6.7% annually, or 1.7% to 4.3% of the 30-year totals

However, mitigation measures designed to fully compensate for the level of expected take and the associated loss in reproduction will be implemented as a part of the any of the action alternatives. Mortality of northern long-eared bats at the 22 covered projects is not expected to be a significant addition to the overall level of northern long-eared bat mortality at wind energy facilities in Region 3. The loss of northern long-eared bats each year during the 30-year permit term is expected to be distributed across many maternity colonies and hibernacula. In the absence of other major threats, we would not expect this level of impact to negatively affect either the Region 3 population or specific maternity or hibernating populations, as it is expected that take would be distributed across multiple maternity colonies and hibernating populations. However, we do not yet fully understand the impacts of WNS on northern long-eared bat populations in Region 3, and the presence of the disease likely will alter the dynamics of the local population (see Section 5.3.3 for a discussion of WNS and northern long-eared bats).

5.3.2.4 Little Brown Bat

Little brown bat fatality within Region 3 is estimated to average 1.13 little brown bats per turbine[47]. Applying this rate to the non-MEC turbines in Region 3, as well as the little brown bats which would be

[47] USFWS (2016e) estimated fatality at 0.67 little brown bat/MW. Applying this to the currently installed capacity (20,108 MW) and then adjusting by the number of turbines (11,960) results in a per turbine estimate of 1.13 bats.

killed at Wind XI turbines, results in an estimated average of 18,956 little brown bats which may be killed annually at other wind turbines within Region 3. As discussed in Section 4.3.3.4.1.2, little brown bat fatalities from the 22 covered projects would depend on the alternative under which the projects are operated. It is predicted that annual mortality of little brown bats by alternative at the 22 covered projects would be as follows:

- No Action Alternative: 536 to 617 little brown bats per year, or 16,080 to 18,510 over the 30-year permit
- Alternative A: 374 to 431 little brown bats per year, or 11,220 to 12,930 over the 30-year permit
- Alternative B: 410 to 471 little brown bats per year, or 12,300 to 14,130 over the 30-year permit
- Alternative C: 413 to 475 little brown bats per year, or 12,390 to 14,250 over the 30-year permit
- Alternative D: 640 to 736 little brown bats per year, or 19,200 to 22,080 over the 30-year permit
- Alternative E: 364 to 419 little brown bats per year, or 10,920 to 12,570 over the 30-year permit
- HCP Alternative: 611 to 736 little brown bats per year, or 18,330 to 22,080 over the 30-year permit

Therefore, take of little brown bats is expected to range from 364 little brown bats per year under Alternative E to 736 little brown bats per year under Alternative D (with the remaining alternatives falling in between this minimum and maximum). Table 5.3-4 below summarizes the annual wind build-out over 30 years and corresponding little brown bat fatalities.

Table 5.3-4. Summary of projected wind turbine development within Region 3 over the 30-year permit term, as well as corresponding little brown bat fatalities.

Year	Non-covered Turbines[1]	Little Brown Bat Fatalities at Non-covered Turbines[2]	Total Little Brown Bat Fatalities (including 364 to 736 annually from the covered projects)	Percent Contribution to Little Brown Bat Fatalities due to the 22 Covered Projects[3]
2017[4]	9,939	11,231	11,595 to 11,967	3.2% to 6.2%
2018[4]	10,395	11,650	12,014 to 12,386	3.1% to 5.9%
2019	11,105	12,216	12,580 to 12,952	3.0% to 5.7%
2020	11,821	12,789	13,153 to 13,525	2.8% to 5.4%
2022	12,445	13,494	13,878 to 14,230	2.7% to 5.2%
2030	15,259	16,674	17,038 to 17,410	2.2% to 4.2%
2040	19,618	21,599	21,963 to 22,335	1.7% to 3.3%
2047	23,345	25,811	26,175 to 26,547	1.4% to 2.8%
2048	23,930	26,472	26,836 to 27,208	1.4% to 2.7%
2049	24,529	27,149	27,513 to 27,885	1.4% to 2.6%
Average[4]	17,272	18,956	19,320 to 19,692	2.0% to 3.9%
Total[4]	n/a	587,627	598,911 to 610,443	1.8% to 3.6%[5]

[1] Based upon 9,939 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Little brown bat fatalities are based on a rate of 0.561 little brown bat/turbine/year for the Wind XI turbines (based on MEC-specific post-construction monitoring data; 1,133 little brown bats divided by 2,021 turbines is 0.561 little brown bat/turbine; see "No Operational Adjustment Scenario" in Section 4.3.3.4.1.2) and a rate of 1.13 little brown bats/turbine/year for the remaining turbines (USFWS 2016i).
[3] The percent contribution is presented as a range based on the minimum and maximum annual mortality under the seven alternatives.
[4] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[5] Total little brown bat fatalities at the 22 covered projects (364 to 736 per year for 30 years) as a percent of the total little brown bat fatalities killed at wind projects (598,911 to 610,443 total).

Take under any of the seven alternatives under consideration would contribute from 1.8% to 3.6% of the little brown bat mortality from wind energy in Region 3 over the 30-year permit term, or 1.4 % to 5.7% annually depending on the year and alternative chosen (Table 5.3-4).

Applying the average little brown bat mortality rate to the expected level of build-out over 30 years results in an estimated 27,149 little brown bats killed annually by the end of the 30-year permit term at other wind energy facilities across Region 3. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 19,330 to 19,692 little brown bats may be killed in Region 3 each year for the next 30 years, for an overall estimated total of 598,911 to 610,443 little brown bats killed in Region 3 during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute between 10,920 and 22,080 little brown bats, depending on the alternative chosen, which is approximately 1.8% to 3.6% of the overall mortality of little brown bats at wind energy facilities within Region 3 over the next 30 years.

By alternative, the 22 covered projects would contribute the following to the total little brown bat mortality from wind energy in Region 3:

- No Action Alternative: 1.9% to 4.8% annually, or 2.7% to 3.1% of the 30-year totals
- Alternative A: 1.4% to 3.4% annually, or 1.9% to 2.2% of the 30-year totals
- Alternative B: 1.5% to 3.7% annually, or 2.1% to 2.3% of the 30-year totals
- Alternative C: 1.5% to 3.7% annually, or 2.1% to 2.4% of the 30-year totals
- Alternative D: 2.3% to 5.7% annually, or 3.2% to 3.6% of the 30-year totals
- Alternative E: 1.3% to 3.3% annually, or 1.8% to 2.1% of the 30-year totals
- HCP Alternative: 2.2% to 5.7% annually, or 3.0% to 3.6% of the 30-year totals

However, mitigation measures designed to fully compensate for the level of expected take and the associated loss in reproduction will be implemented as a part of any of the action alternatives. Mortality of little brown bats at the 22 covered projects is not expected to be a significant addition to the overall level of little brown bat mortality at wind energy facilities in Region 3. The loss of little brown bats each year during the 30-year permit term is expected to be distributed across many maternity colonies and hibernacula. In the absence of other major threats, we would not expect this level of impact to negatively affect either the Region 3 population or specific maternity or hibernating populations. However, we do not yet fully understand the impacts of WNS on little brown bat populations in Region 3, and the presence of the disease likely will alter the dynamics of the local population (see Section 5.3.3 for a discussion of WNS and little brown bats).

5.3.2.5 Tri-Colored Bat

Tri-colored bat fatality within Region 3 is estimated to average 0.57 tri-colored bat per turbine[48]. Applying this rate to the non-MEC turbines in Region 3 and to the Wind XI turbines results in an estimated average of 9,628 tri-colored bats which may be killed annually at other wind turbines (excluding the 22 covered projects) within Region 3. As discussed in Section 4.3.3.5.1.2, tri-colored bat fatalities from the 22 covered projects would depend on the alternative under which the projects are operated. It is predicted that annual mortality of tri-colored bats at the 22 covered projects would be as follows:

- No Action Alternative: 343 to 406 tri-colored bats per year, or 10,290 to 12,180 over the 30-year permit term
- Alternative A: 226 to 268 tri-colored bats per year, or 6,780 to 8,040 over the 30-year permit term
- Alternative B: 248 to 294 tri-colored bats per year, or 7,440 to 8,820 over the 30-year permit term
- Alternative C: 250 to 296 tri-colored bats per year, or 7,500 to 8,880 over the 30-year permit term
- Alternative D: 387 to 459 tri-colored bats per year, or 11,610 to 13,770 over the 30-year permit term
- Alternative E: 221 to 261 tri-colored bats per year, or 6,630 to 7,830 over the 30-year permit term

[48] USFWS (2016e) did not estimate a rate for tri-colored bats (as they were not a covered species); however, based upon species composition of fatalities in region 3, it is assumed that tri-colored bat fatalities are approximately 50% of little brown bat fatalities.

- HCP Alternative: 370 to 459 tri-colored bats per year, or 11,100 to 13,770 over the 30-year permit term

Therefore, take of tri-colored bats is expected to range from 221 tri-colored bats per year under Alternative E to 459 tri-colored bats per year under Alternative D (with the remaining alternatives falling in between this minimum and maximum). Table 5.3-5 below summarizes the annual wind build-out over 30 years and corresponding tri-colored bat fatalities.

Table 5.3-5. Summary of projected wind turbine development within Region 3 over the 30-year permit term, as well as corresponding tri-colored bat fatalities.

Year	Non-MEC Turbines[1]	Tri-colored Bat Fatalities at Non-covered Turbines[2]	Total Tri-colored Bat Fatalities (Including 221 to 459 Annually from the Covered Projects)	Percent Contribution to Tri-colored Bat Fatalities due to the 22 Covered Projects[3]
2017[4]	9,939	5,665	5,886 to 6,124	3.8% to 7.5%
2018[4]	10,395	5,888	6,109 to 6,347	3.6% to 7.2%
2019	11,105	6,201	6,422 to 6,660	3.4% to 6.9%
2020	11,821	6,518	6,739 to 6,977	3.3% to 6.6%
2030	15,259	8,478	8,699 to 8,937	2.5% to 5.1%
2040	19,618	10,962	11,183 to 11,421	2.0% to 4.0%
2047	23,345	13,087	13,308 to 13,546	1.7% to 3.4%
2048	23,930	13,420	13,641 to 13,879	1.7% to 3.3%
2049	24,529	13,762	13,983 to 14,221	1.6% to 3.2%
Average[4]	17,272	9,628	9,854 to 10,087	2.4% to 4.8%
Total[4]	n/a	298,463	305,314 to 312,692	2.2% to 4.4%[5]

[1] Based upon 9,939 turbines in 2017 and a 2.4% annual growth. In addition, Wind XI turbines were added to this total (169 turbines in 2018 [Beaver Creek and Prairie], and the remaining 831 turbines were split between 2019 and 2020 for their first year of operations).
[2] Tri-colored bat fatalities are based on a rate of 0.35 tri-colored bat/turbine/year for the Wind XI turbines (based on MEC-specific post-construction monitoring data; 706 tri-colored bats divided by 2,021 turbines is 0.35 tri-colored bat/turbine; see "No Operational Adjustment Scenario" in Section 4.3.3.2.1.2) and a rate of 0.57 tri-colored bat/turbine/year for the remaining turbines (USFWS 2016i).
[3] The percent contribution is presented as a range based on the minimum and maximum annual mortality under the seven alternatives.
[4] The values for 2017 and 2018 are included as a baseline, but impacts during 2017 and 2018 would occur prior to the permit term and are not included in the averages or totals.
[5] Total tri-colored bat fatalities at the 22 covered projects (221 to 459 per year for 30 years) as a percent of the total tri-colored bat fatalities killed at wind projects (305,314 to 312,692 total).

Take under any of the seven alternatives under consideration would contribute from 2.4% to 4.4% of the tri-colored bat mortality from wind energy in Region 3 over the 30-year permit term, or 1.6% to 6.9% annually depending on the year and alternative chosen (Table 5.3-5).

Applying the average tri-colored bat mortality rate (0.57 tri-colored bat/turbine/year) to the expected level of build-out over 30 years, and including predicted take from Wind XI, results in an estimated 13,762 tri-

colored bats killed annually by the end of the 30-year permit term at other wind energy facilities across Region 3. Although the number of installed wind turbines would change each year, assuming a 2.4% growth each year, an estimated average of 9,854 to 10,087 tri-colored bats are calculated to be killed in Region 3 each year for the next 30 years, for an overall estimated total of 305,314 to 312,692 tri-colored bats killed in Region 3 during the 30-year permit term. Of this mortality, MEC's 22 covered projects will contribute between 6,630 and 13,770 tri-colored bats, depending on the alternative chosen, which is approximately 2.2% to 4.4% of the overall mortality of tri-colored bats at wind energy facilities within Region 3 over the next 30 years.

By alternative, the 22 covered projects would contribute the following to the total tri-colored bat mortality from wind energy in Region 3:

- No Action Alternative: 2.4% to 6.1% annually, or 3.3% to 3.9% of the 30-year totals
- Alternative A: 1.6% to 4.1% annually, or 2.2% to 2.6% of the 30-year totals
- Alternative B: 1.8% to 4.5% annually, or 2.4% to 2.9% of the 30-year totals
- Alternative C: 1.8% to 4.6% annually, or 2.5% to 2.9% of the 30-year totals
- Alternative D: 2.7% to 6.9% annually, or 3.7% to 4.4% of the 30-year totals
- Alternative E: 1.6% to 4.0% annually, or 2.2% to 2.6% of the 30-year totals
- HCP Alternative: 2.6% to 6.9% annually, or 3.6% to 4.4% of the 30-year totals

However, mitigation measures designed to fully compensate for the level of expected take and the associated loss in reproduction will be implemented as a part of the any of the action alternatives. Mortality of tri-colored bats at the 22 covered projects is not expected to be a significant addition to the overall level of tri-colored bat mortality at wind energy facilities in Region 3. The loss of tri-colored bats each year during the 30-year permit term is expected to be distributed across many maternity colonies and hibernacula. In the absence of other major threats, we would not expect this level of impact to negatively affect either the Region 3 population or specific maternity or hibernating populations. However, we do not yet fully understand the impacts of WNS on tri-colored bat populations in Region 3, and the presence of the disease will likely alter the dynamics of the local population (see Section 5.3.3 for a discussion of WNS and tri-colored bats).

5.3.3 White-Nose Syndrome

The following section on WNS addresses bat species not listed under the ESA or covered by the HCP and the covered bat species (Indiana bat, northern long-eared bat, little brown bat and tri-colored bat) together in order to allow for a broader discussion of cumulative impacts from WNS.

WNS has emerged as the largest single source of mortality for cave-hibernating bats in recent years. As of October 2017, WNS has been confirmed in 31 states (including Iowa) and 5 Canadian provinces, as far west as Washington State, and the fungus that causes WNS has been confirmed in 2 additional states (USFWS 2017f). As of 2012, estimates of total bat mortality had reached 6.7 million bats since discovery of the disease in 2006 (USFWS 2012b). To date, WNS has not been documented in migratory tree-

roosting bat species (e.g., hoary bat, silver-haired bat, eastern red bat), which account for the majority of wind turbine related mortality.

Turner et al. (2011) documented an 88% decline in overall numbers of hibernating bats comparing pre- and post-WNS counts at 42 sites in five Northeastern states, with declines varying by species. At these sites, northern long-eared bats decreased by 98%, little brown bats by 91%, tri-colored bats by 75%, Indiana bats by 72%, and big brown bats by 41% (Turner et al. 2011). It is unclear whether Region 3 or the OCRU will experience the same outcomes observed in the Northeast; however, WNS has been confirmed in every state within Region 3 and the OCRU (USFWS 2017f). The population statuses for northern long-eared bats, little brown bats, tri-colored bats, and big brown bats are not well understood, and declines are difficult to track. It is expected that WNS may eventually affect all cave-dwelling bat species found in Region 3. However, it is possible that overall population numbers for big brown bats may remain stable or possibly increase, since this species is known to commonly overwinter in manmade dwellings (i.e., no WNS impact). Being a generalist species, it is also very likely that big brown bats are exploiting an increase in prey items resulting from the decline of *Myotis* species.

The rate at which WNS may impact Region 3 bat populations cannot be predicted, as the progression from detection of a single bat with visible fungus to large-scale mortality has been observed to occur within a matter of weeks at some sites in the Northeast, while at others it has not occurred until the next hibernation season, or even later (Turner et al. 2011). However, it is expected that WNS will ultimately have similarly devastating impacts on Region 3 hibernacula, causing mortality similar to that observed in the Northeastern United States and possibly the abandonment or extinction of certain hibernacula. Although efforts are ongoing to study the basic biology of WNS and to generate a toolkit of mitigation strategies, it is unknown if and when effective mechanisms for fighting WNS will be developed. Therefore, the impacts of WNS on cave-dwelling bat populations in Region 3 are expected to be severe, which will make additional mortality from other sources, such as wind energy facilities, more significant. Indiana bats will serve as an indicator of WNS impacts to cave-dwelling bat species in the region because more population data are available for this species than any other in the region, enabling the most accurate evaluation of WNS impacts.

The 2017 population estimates for Indiana bats showed a 0.3% decline for Region 3 and a 0.3% increase for the OCRU since 2015 (USFWS 2017c). Range-wide, the Service has estimated a decline of 20% in the number of Indiana bats since 2007 (USFWS 2017c), more than likely due to WNS, and Indiana bat mortality estimates in individual hibernacula have reached 100% (Turner et al. 2011). This does not necessarily represent the total decline due to WNS, although certain Northeastern bat populations appear to be stabilizing or even increasing gradually several years following the initial discovery of WNS. As of October 2017, the disease has been confirmed in multiple hibernacula in the OCRU. Mortality associated with the disease in the OCRU and Region 3 could be similar to that documented in the Appalachian Mountain Recovery Unit (a 53.8% decline between 2015 and 2017; USFWS 2017c). A 53.8% decline in Indiana bat population in the OCRU from 2017 population levels would amount to a loss of over 146,000 Indiana bats. Such a decline in Indiana bat populations across the region would likely reduce the probability of Indiana bat mortality at wind projects but would also increase the ecological impact of all sources of mortality.

The mortality of up to 36,200 non-listed and non-covered bats per year from the 22 covered projects under Alternative D (the worst-case scenario of the seven alternatives) would be spread across multiple species, with up to an additional 25 Indiana bats, 21 northern long-eared bats, 736 little brown bats, and 459 tri-colored bats, with lower levels of take under other alternatives. The impacts of WNS on bats may be severe for cave-dwelling bats, which would make additional mortality from other sources, such as wind energy facilities, more significant, though may also decrease the probability of collision mortality due to decreased population sizes.

5.3.4 Climate Change

Climate change is anticipated to affect bat species in several ways. Droughts may result in higher mortality for some species; this has been demonstrated for the big brown bat and little brown bat (O'Shea et al. 2011; Frick et al. 2010). Conversely, depending on the timing, increases in precipitation can be beneficial for insectivorous bat species by increasing prey availability (Moosman et al. 2012).

Climate change may also increase riparian habitat in some areas (e.g., through increased precipitation), increasing foraging habitat for species like the big brown bat and hoary bat. Some species, such as the eastern red bat, may be expanding their range due to climate change (Willis and Brigham 2003), though this could also result in their disappearance from other parts of their range where temperatures increase too much.

None of the seven alternatives under consideration would increase the effects of climate change; instead, all seven alternatives are expected have a beneficial impact to the cumulative effects of climate change by reducing greenhouse gas emissions through the production of electricity via wind energy (i.e., a reduction in the amount of fossil fuels used to produce electricity). The difference in effects between the alternatives, or from current operations, is small relative to the overall beneficial effect for each alternative.

The mortality of up to 36,200 non-listed and non-covered bats per year from the 22 covered projects under Alternative D (the worst-case scenario of the seven alternatives) would be spread across multiple species, with up to an additional 25 Indiana bats, 21 northern long-eared bats, 736 little brown bats, and 459 tri-colored bats, with lower levels of take under other alternatives. The impacts of climate change on bats may be severe for some species in certain geographic regions, which would make additional mortality from other sources, such as wind energy facilities, more significant, especially for species also impacted by WNS.

5.3.5 Habitat Loss and Fragmentation

The following section on habitat loss and fragmentation addresses bat species not listed under the ESA or covered by the HCP and the bat covered species (Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat) together to allow for a broader discussion of cumulative habitat impacts.

Cumulative impacts of land use conversion and habitat fragmentation on bats in Region 3 and the OCRU have largely taken place in the past, as agricultural land use has dominated the region for decades.

However, future losses in forested habitat are likely to occur as a result of expanding urban areas or high grain prices (i.e., high grain prices result in conversion of non-cropped areas to cropped). It is difficult to state whether this effect would be offset by any concurrent reversion of croplands to forests.

Operation of the 22 covered projects would not result in additional forest clearing and may even create forested habitat through efforts to mitigate impacts to bats. Therefore, the 22 covered projects are not expected to contribute to any incremental cumulative effects of summer bat habitat loss.

Similarly, winter bat habitat (caves and mines) are relatively static features on the landscape and are not being threatened by specific threats associated with habitat loss. WNS may have drastic impacts on hibernating bat populations but will not alter the physical characteristics of hibernacula. Ongoing efforts to gate hibernacula to prevent human access and disturbance will further avoid cumulative impacts to winter bat habitat.

5.3.6 Summary of Cumulative Effects to Bats

The biological significance of cumulative impacts is dependent on the life-history strategy of the species in question. Life-history characteristics of a species population determine the degree to which its viability is affected by added mortality. Organisms whose populations are characterized by low birth-rate, long life-span, naturally low mortality rates (Pianka 1970), high trophic level, and small geographic ranges are likely to be most susceptible to cumulative, long-term impacts on population size, genetic diversity, and ultimately, population viability (McKinney 1997; Purvis et al. 2000 as cited in NRC 2007).

With some variation, bats as a group have relatively long life spans and produce relatively few offspring compared with other small mammals. Given the historic stressors typically associated with their life history strategies, the mortality of bats caused by turbine collision or barotrauma is considered to be an additive effect to other modern stressors now adversely affecting population levels (such as disease, predation, and habitat loss and degradation which decrease reproduction and survival). Even though each individual wind project may only contribute a small percentage of the overall mortality, the multiple sources of mortality together may result in significant losses, especially in light of the mortality observed due to WNS.

The effect of cumulative mortality on cave-dwelling and tree-roosting migratory bat populations is highly uncertain because estimates of current population sizes are unknown. The cumulative effect of wind power mortality on low fecundity, cave-dwelling bats is additive to the already high mortality caused by WNS. Tree-roosting bat mortality at wind power projects is significantly higher than that experienced by cave-dwelling bats; however, other significant sources of mortality for tree-roosting bats are unknown. To understand the implications of cumulative bat mortality requires knowledge of baseline populations. Unfortunately, there is little information on current population estimates for most bat species in North America at local, regional, or continental scales (O'Shea et al. 2004; Kunz et al. 2007a). It is unknown whether or not tree bat populations can be sustained under a new threat that may cause the loss of millions of bats over the next 30 years.

Many cave-dwelling bats are experiencing moderate to significant population declines from WNS, and declines from WNS have averaged 88%, ranging from 41% declines for the big brown bat to 98% declines for the northern long-eared bat (Turner et al. 2011). Seemingly negligible annual mortality of bats from wind energy facilities may become an important population impact in time should populations of cave-dwelling bats, including all four covered bat species (Indiana bat, northern long-eared bat, little brown bat, and tri-colored bat), become reduced to the point that they cannot recover. WNS may reduce cave-dwelling bats to such low numbers it may become necessary for MEC, under the Service's direction, to implement changed circumstances for the covered bat species. In Section 8.2, the MEC HCP discusses those foreseeable changed circumstances and MEC's proposed measures for addressing them should they occur. The responses are designed to reduce the impact to the covered bat species under the reduced population numbers brought about by WNS. It is likely that other wind energy projects regulated under the ESA (i.e., those with ITPs) would have similar measures in place. This would presumably lessen the cumulative impact of wind energy on covered bat populations affected by WNS in the Region.

The impact of the build-out of wind energy over the next 30-years on cave-dwelling bats, in combination with the other major stressor, WNS, is unknown. There are various possibilities, including a synergistic effect of two new stressors (collision mortality at wind energy projects and WNS mortality) affecting the species at the same time. It is also possible that as the populations of cave dwelling bats are reduced by WNS, as they almost certainly will be, the total number of bats taken by wind facilities will be less. However, the impacts of taking those fewer bats could increase, since each individual will become more important as the population decreases. Research into these questions is ongoing and will likely focus in part on how these new stressors will affect not only the numbers of bats but also their life histories, particularly maternity colony and hibernaculum dynamics.

5.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

As stated in 40 CFR 1502.16, the Service must identify, as part of the environmental consequences section of an EIS, any irreversible or irretrievable commitments of resources which would be involved in the proposed action or alternative. Irreversible commitment of resources refers to the loss, as a result of the project, of future options for resource development or management, especially of nonrenewable resources such as minerals and cultural resources. Irretrievable commitment of resources refers to the lost production or use value of renewable natural resources as a result of the project. Operation of the 22 covered projects, along with implementation of mitigation for the covered species, would not involve the irreversible and irretrievable commitment of material resources and energy.

Operations of the 22 covered projects would result in an irreversible or irretrievable loss of some biological resources over the life of the projects, including the covered bat species, bald eagles, non-listed and non-covered bats, and birds. These are summarized by alternative in the Table 5.4-1 below.

Table 5.4-1. Summary of estimated permit-term fatalities of non-listed birds, bald eagles, non-listed and non-covered bats, Indiana bats, northern long-eared bats, little brown bats, and tri-colored bats by alternative (see Table 4.1-1 for operational details).

	No Action Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	HCP Alternative
Non-listed Birds	379,920	379,920	379,920	379,920	379,920	379,920	379,920
Bald Eagles	300	300	300	300	300	300	300
Non-listed and Non-Covered Bats	909,750	634,890	693,240	699,840	1,086,000	618,180	1,007,280
Indiana Bats	0	180 to 420	180 to 420	180 to 480	300 to 750	180 to 420	270 to 720
Northern long-eared Bats	210 to 510	150 to 390	150 to 390	150 to 420	240 to 630	150 to 390	240 to 600
Little Brown Bats	16,080 to 18,510	11,220 to 12,930	12,300 to 14,130	12,390 to 14,250	19,200 to 22,080	10,920 to 12,570	18,330 to 21,090
Tri-colored Bats	10,290 to 12,180	6,780 to 8,040	7,440 to 8,820	7,500 to 8,880	11,610 to 13,770	6,630 to 7,830	11,100 to 13,140

5.5 IDENTIFICATION OF PREFERRED ALTERNATIVE

The Department of the Interior (DOI) defines the preferred alternative as "the alternative which the [agency] believes would best accomplish the purpose and need of the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors" (43 CFR 46.420(d)). The preferred alternative may or may not be the same as the project proponent's proposed action or the environmentally preferable alternative. When an EIS has been prepared the ROD must identify all alternatives considered and specify the environmentally preferable alternative(s) (40 CFR 1505.2(b). The environmentally preferable alternative is that which reflects the policy in Section 101 of NEPA, i.e., the alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources (43 CFR 46.30).

The "preferred alternative" is a preliminary indication of the federal responsible official's preference of action, which is chosen from among the alternatives analyzed in an EIS. The preferred alternative may be selected for a variety of reasons (such as the priorities of the particular lead agency) in addition to the

environmental considerations discussed in the EIS. The preferred alternative is not a final agency decision; rather, it is an indication of the agency's preference. The final agency decision is presented in the Findings document associated with the permit.

In accordance with NEPA and the CEQ regulations and based on consideration of agency and public comments on the DEIS, the Service has selected MEC's HCP Alternative as the preferred alternative. Of the alternatives evaluated in this FEIS, this alternative best fulfills the agency's statutory mission and responsibilities while meeting the purpose and need for the following reasons:

1. Issuance of an ITP under the MEC's HCP Alternative would reduce impacts to Covered Species and provide compensatory mitigation to offset the loss of Covered Species as a result of operation of the 22 facilities.

2. Issuance of an ITP meets the need of MEC to implement their HCP and to operate the covered facilities legally under the ESA and BGEPA.

6.0 CONSULTATION AND COORDINATION WITH OTHERS

In accordance with NEPA, the DEIS was circulated for public review and comment. The DEIS was published in the Federal Register for public review on August 31, 2018 (83 FR 44652), in accordance with requirements set forth in the NEPA and its implementing regulations. Public comments were accepted during a 45-day period following publication of the Federal Register Notice of Availability. One public hearing was held during the comment period, on September 27, 2018, in Ankeny, Iowa. An online public hearing was also held during the comment period, on October 3, 2018. Responses to substantive comments on the DEIS and Draft HCP can be found in Appendix E of this EIS.
The DEIS was distributed to individuals and organizations who specifically requested a copy of the document. In addition, copies or web links were sent to elected officials, federal agencies, and state, county, and local offices. Hard copies of the DEIS were made available to the public at the following locations:

- Federal Agencies
    - U.S. Department of the Interior, U.S. Fish and Wildlife Service, Illinois-Iowa Field Office

- Units of Local Government:
    - Greenfield Public Library, Corning Public Library, Audubon Public Library, Storm Lake Public Library, Carroll Public Library, Atlantic Public Library, Norelius Community Library, Charles City Public Library, Kling Memorial Library, Mary Barnett Memorial Library, Kendall Young Library, Ida Grove City Library, Winterset Public Library, Marshalltown Public Library, Primghar Public Library, Pocahontas Public Library, Central Library, Council Bluffs Public Library, Sac City Public Library, Parks Library, Toledo Public Library, Fort Dodge Public Library, Clarion Public Library

APPENDIX A – LIST OF PREPARERS

Name	Organization	Project Role and Qualifications
Amber Schorg	USFWS	Subject Matter Expert, USFWS Biologist
Kraig McPeek	USFWS	Project Manager, IL-IA Field Office Supervisor
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Molly Stephenson	Stantec	EIS Preparation M.S. Wildlife Biology 7 years' experience with environmental studies, include wind-wildlife interactions, habitat conservation plans, and NEPA documentation
Stacey Parks	Stantec	EIS Preparation B.A. Biological Resources 17 years' experience with environmental studies, including wetland delineations and permitting, NEPA documentation
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APPENDIX C - GLOSSARY

Affected Environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air quality: Assessment of the health-related and visual characteristics of the air often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances. Air quality standards are the prescribed levels of substances in the outside air that cannot be exceeded during a specific time in a specified area.

Air Quality Standards: The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area.

Anthropogenic: Human impact on the environment.

Bald and Golden Eagle Protection Act (BGEPA): A Federal law enacted in 1940 and amended several times, prohibits anyone, without a permit from the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs.

Best Management Practices (BMP): Structural and/or management practices employed before, during, and after construction to protect receiving-water quality. These practices provide techniques to either reduce soil erosion or remove sediment and pollutants from surface runoff.

Bird and Bat Conservation Strategy (BBCS): Documents measures a company has taken to properly construct and operate a wind energy facility to avoid and minimize impacts to migratory birds and other sensitive species.

Clean Air Act: This act establishes national ambient air quality standards and requires facilities to comply with emission limits or reduction limits stipulated.

Code of Federal Regulations (CFR): A compilation of the general and permanent rules published in the Federal Register by the executive departments and agencies of the United States. It is divided into 50 titles that represent broad areas subject to Federal regulation. Each volume of the CFR is updated once each calendar year and is issued on a quarterly basis.

Council on Environmental Quality (CEQ): Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. A CEQ regulation (Title 40 CFR parts 1500-1508, as of July 1, 1986) describes the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Critical Habitat: The specific area within the geographical area occupied by a species at the time it is listed as an endangered or threatened species. The area in which physical or biological features essential to the conservation of the species is found. These areas may require special management or protection.

Cumulative Impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what

agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Decommissioning: All activities necessary to take out of service and dispose of a facility after its useful life.

Direct Effects: The immediate effects on the social, economic, and physical environment caused by the action. These impacts are usually experienced within the immediate vicinity of the proposed action.

Diurnal: Having a daily cycle or occurring every day.

Eagle Conservation Plan Guidance (ECPG): A set of guidelines for conserving bald and golden eagles during the siting, construction, and operation of wind energy facilities.

Echolocation: The use of reflected sound waves by some animals to gather critical information, such as the location of obstructions, predators, food, or for purposes of reproduction.

Ecoregion: A geographically distinct area of land that is characterized by a distinctive climate, ecological features, and plant and animal communities.

Ecosystem: A group of organisms and their physical environment interacting as an ecological unit.

Effect: A direct result of an action that occurs at the same time or place, or an indirect result of an action which occurs later in time or in a different place and is reasonably foreseeable.

Endangered Species: Any species (plant or animal) that is in danger of extinction throughout all or a significant part of its range. Requirements for declaring a species endangered are found in the Endangered Species Act.

Endangered Species Act (ESA): This act from 1973 requires consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to determine if endangered or threatened species or their habitats will be impacted by a proposed activity and what, if any, mitigation measure are needed to address the impacts.

Environmental Impact Statement (EIS): A document required of Federal agencies by the National Environmental Policy Act for major proposals or legislation that will or could significantly affect the environment.

Environmental Justice: The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Erosion: The wearing away of the land surface by wind and water.

Fecundity: The potential reproductive capacity of an individual or population.

Floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas, including at a minimum that area inundated by a 1-percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

Generation-tie (gen-tie): A connection between systems, such as electrical power or communications systems.

Greenhouse gases: Gases that warm the earth's atmosphere by absorbing solar radiation reflected from the earth's surface.

Groundwater: Water within the earth that supplies wells and springs.

Habitat: The place where a plant or animal lives.

Habitat Conservation Plan (HCP): Agreements and wildlife plans outlining methods for maintaining, enhancing, and protecting habitat needed for listed species on a property.

Harm: An act that actually kills or injures listed wildlife, including significant habitat modification or degradation which significantly impairs essential behavioral patterns, including but not limited to breeding, feeding, or sheltering.

Harass: An intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to an extent as to significantly disrupt normal behavioral patterns, including but not limited to breeding, feeding, or sheltering.

Hazardous Material: Any material that poses a threat to human health and/or the environment. Hazardous materials are typically toxic, corrosive, ignitable, explosive, or chemically reactive.

Hibernaculum: Refers to a place in which an animal seeks refuge for winter hibernation.

Historic Properties: Any prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. They include artifacts, records, and remains that are related to and located within such properties.

Impact: *See* definition for "Effect".

Incidental take: Take of any federally-listed wildlife species that is incidental to, but not the purpose of, otherwise lawful activities.

Indirect Effects: Effects caused by a given action occurring later in time or farther removed in distance but that are reasonably foreseeable (e.g., induced changes to land-use patterns, population density, and growth rate).

Infrastructure: Basic physical and organizational structures needed for the operation of a society or enterprise.

Irretrievable: Applies to losses of production, harvest, or commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed.

Irreversible: A term that describes the loss of future options and applies primarily to the effects, or use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.

Land-Based Wind Energy Guidelines (LWEG): A set of guidelines to help ensure wind farms minimize impacts on wildlife, through the use of species-specific study protocols; best management practices for construction, operation, and retrofitting; repowering; and decommissioning.

Lekking Site: A traditional place where males of certain species assemble during the mating season and engage in competitive displays.

Megawatt (MW): The electrical unit of power that equals one million watts or one thousand kilowatts.

Migratory Bird Treaty Act (MBTA): Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention for the protection of migratory birds or any part, nest, or egg of any such bird." (16 U.S.C. 703)

Migration: Periodic movements from one region or climate to another, such as certain species of birds, fish, and other animals.

Mitigation: Under NEPA regulations, to moderate, reduce, or alleviate the impacts of a proposed activity, such as through compensating for the impact by replacing or providing substitute resources or environments.

Mitigation Measures: Specific design commitments made during the environmental evaluation and study process that serve to moderate or lessen impacts deriving from a proposed action. In accordance with CEQ Regulations, mitigation includes avoidance, minimization, rectification, reduction, and compensation.

National Ambient Air Quality Standards (NAAQS): Air quality standards established by the Clean Air Act, as amended. The primary National Ambient Air Quality Standards specify maximum outdoor air concentrations of criteria pollutants that would protect the public health within an adequate margin of safety. The secondary National Ambient Air Quality Standards specify maximum concentration that would protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Environmental Policy Act (NEPA): This act (42 U.S.C. § 4341, passed by Congress in 1975) established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the CEQ. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

National Historic Preservation Act (NHPA): This 1966 act requires Federal agencies to prepare a detailed statement on the environmental impacts of their proposed major actions significantly affecting the quality of the human environment.

National Register of Historic Places (NRHP): The NRHP is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National

Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

Notice of Availability (NOA): A formal notice, published in the Federal Register, which announces the issuance and public availability of a draft or final EIS.

Notice of Intent (NOI): A formal announcement of intent to prepare an EIS.

Partners in Flight (PIF): Organization involving partnerships among federal, state, and local agencies, philanthropic foundations, professional organizations, conservation groups, and private individuals that emphasizes the conservation of birds not covered by existing conservation initiatives.

Particulate matter: Fine solid or liquid particles, such as dust, smoke, mist, fumes, or smog found in air or emissions.

Passerine: Perching birds.

Population: A group of individuals of the same species occupying a defined locality during a given time that exhibit reproductive continuity from generation to generation.

Proposed Action: Under NEPA, a plan that has a goal which contains sufficient details about the intended actions to be taken or that will result, to allow alternatives to be developed and its environmental impacts to be analyzed (40 CFR part 1508.23).

Raptor: Bird of prey, such as an eagle, owl, or hawk.

Renewable Energy: Alternative energy sources, such as wind power or solar energy, that can keep producing energy indefinitely without being used up.

Riparian: Relating to, living in, or located on the bank of a river, lake, or tidewater.

Rotor: The portion of a modern wind turbine that interacts with the wind. It is composed of the blades and the central hub to which the blades are attached.

Scoping: An early, open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Section 10 of the Endangered Species Act (ESA): The section of the Endangered Species Act that establishes a program whereby applicants may be authorized, through issuance of an Incidental Take Permit, to conduct activities that may result in take of a listed species, as long as the take is incidental to, and not the purpose of, otherwise lawful activities.

Shelterbelt: A plantation usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from wind and protect soil from erosion.

Special Concern: When relating to a species, may have a declining population, limited occurrence, or low numbers for any of a variety of reasons.

Species: Any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds in nature.

Substation: A facility where electric energy is passed for transmission, transformation, distribution, or switching.

Sulfur dioxide (SO_2): A gas formed from burning fossil fuels. Sulfur dioxide is one of the six criteria air pollutants specified under Title I of the Clean Air Act.

Sulfur hexafluoride (SF_6): A colorless, odorless gas considered by the Intergovernmental Panel on Climate Change to be one of the more potent greenhouse gases in the atmosphere. SF_6 is used in electrical equipment, such as circuit breakers.

Supervisory Control and Data Acquisition (SCADA): A software program used to communicate directly with individual wind turbines to monitor performance, report energy output, and trouble-shoot technical difficulties.

Surface Water: All bodies of water on the surface of the earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Take: Under section 3(18) of the ESA, "…to harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with respect to federally listed species of wildlife.

Topography: The elevation or slope of the land surface.

Transmission Line: The structures, insulators, conductors, and other equipment used to transfer electrical power from one point to another.

Visual Resource: The visible physical features of a landscape.

Wetlands: Areas that are soaked or flooded by surface or groundwater frequently enough or long enough to support plants, birds, animals, and aquatic life. Wetlands generally include swamps, marshes, bogs, estuaries, and other inland and coastal areas and are federally protected.

APPENDIX D - ACRONYMS

AVWS	Audio Visual Warning System
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BCI	Bat Conservation International
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BO	Biological Opinion
CAA	Clean Air Act
CBD	Center for Biological Diversity
CEQ	Council on Environmental Quality
DBH	Diameter at Breast Height
DDT	Dicholoro-diphenyl-trichloroethene
DEIS	Draft Environmental Impact Statement
DW	Defenders of Wildlife
ECPG	Eagle Conservation Plan Guidance
EIS	Environmental Impact Statement
EMU	Eagle Management Units
EPWL	Endangered Plants and Wildlife Law
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FRHCP	Federal RegisterHabitat Conservation Plan
IDNR	Iowa Department of Natural Resources
ITP	Incidental Take Permit
LAP	Local Area Population
LWEG	Land-Based Wind Energy Guidelines
MBTA	Migratory Bird Treaty Act
MEC	MidAmerican Energy Company
MET	Meteorological
MSHCP	Multi-Species Habitat Conservation Plan
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	National Park Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
O&M	Operations and Maintenance

OCRU	Ozark-Central Recovery Unit
REA	Resource Equivalency Analysis
ROD	Record of Decision
SCADA	Supervisory Control and Data Acquisition
TNC	The Nature Conservancy
UNFCCC	United Nations Framework Convention on Climate Change
USDA	United States Department of Agriculture
USEIA	United States Energy Information Administration
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPS	United States Postal Service
WEST	Western EcoSystems Technology
WNS	White-nose Syndrome

APPENDIX E – COMMENTS RECEIVED ON THE HCP AND DEIS AND RESPONSES TO PUBLIC COMMENTS

The Service received 87 comments through regulations.gov, five comments via email at the Illinois-Iowa Field Office, two comments during the in-person public hearing, and one comment via hard copy letter to the Service's Headquarters in Falls Church, Virginia. It should be noted that some duplicate comments were received, and some individual commenters submitted multiple comments. A summary of the types of substantive comments we received, and our general responses are provided below. Responses to individual comments are provided in the matrix, below the summary.

Comment: Several commenters requested that the permit be denied, no taking of covered bats or eagles be allowed, and/or the no-action alternative be selected. Response: Section 10(a)(1)(B) of the Endangered Species Act provides for the issuance of incidental take permits to applicants who have submitted a permit application and conservation plan that meets the issuance criteria set forth in the Act and associated regulations in 50 CFR 17. Also, incidental take of bald eagles may be authorized under section 10 of the ESA per 50 CFR 22.11. Therefore, the Service is evaluating whether or not the plan meets the required issuance criteria for covered species and is making a permit decision accordingly. The Record of Decision will be provided following the notice period for the Final EIS.

Comment: Several commenters provided support for the multi-project, landscape-scale approach to permitting multiple facilities, and the selection of the HCP as the preferred alternative. Response: Section 10(a)(1)(B) of the Endangered Species Act provides for the issuance of incidental take permits to applicants who have submitted a permit application and conservation plan that meets the issuance criteria set forth in the Act and associated regulations in 50 CFR 17. Also, incidental take of bald eagles may be authorized under section 10 of the ESA per 50 CFR 22.11. Therefore, the Service will evaluate whether or not the plan meets the required issuance criteria for covered species and make a permit decision accordingly.

Comment: Several commenters expressed concern about the impact of killing bats in general (including non-covered species) on insect populations, local economics and the potential for increased pesticide use. Response: An evaluation of the ecosystem benefits of bats and their relationship to pesticide use has been added to the Affected Environment (Chapter 3.3 in the EIS).

Comment: Several commenters provided comments against the constructions of wind turbines and/or siting of new turbines in various locations in Iowa. Response: The federal action under review at this time is the issuance of a permit for 22 existing and operational wind projects. The construction of turbines is not within the scope of this federal action because the covered projects are already operating.

Comment: Comments were received regarding the proposed permit duration. Some commenters stated that the 30-year requested permit term is appropriate. Several commenters expressed concern with the 30-year permit duration in that the impact of the taking may not be able to be calculated accurately over a long period of time, new technologies may become available that may affect the amount of take in the long-term, or that changes to the environment may occur that cannot be contemplated currently. Response: The Service has expanded the evaluation of the issuance of a shorter term permit in Chapter 2 of the EIS. Furthermore 50 CFR 17.22 and 50 CFR 17.32, states that "…the Director shall consider the duration of the planned activities, as well as the possible positive and negative effects associated with the

permits of the proposed duration on listed species…" The Service will consider the proposed duration of the permit and the expected performance of the adaptive management measures when evaluating whether or not the permit application meets issuance criteria.

Comment: Recommendations for including other entities, stakeholders, and/or subcontractors into the mitigation implementation plan were received. Response: It is the applicant's intention that INHF be the primary mitigation entity, but other partners, stakeholders, and entities, where feasible, will be included when executing the mitigation actions. This has been clarified in Chapter 5 of the HCP.

The Audubon Society, Sierra Club, and Nature Conservancy and a few others also provided unique comments that did not fall into the above categories. Please see the comment summary below and the matrix for responses to specific comments.

<u>The Audubon Society</u>

The Audubon Society provided comments specific to data collected under the HCP, data included in the HCP and EIS analyses, adaptive management measures, and eagle mitigation, as summarized below.

1. A statement that data collected under the HCP should be made public.
    a. Data collected under a federal permit is usually considered public information. Therefore, compliance reports generated during the implementation of the HCP will also be publicly available.
2. A request that the data from projects monitored in 2017 be incorporated into the FEIS
    a. The data from the projects monitored in 2017 have been incorporated into the bird and bat impact calculations in the FEIS.
3. A recommendation to include technologies for detection and avoidance of bald eagles and other technologies that may be developed over the permit term.
    a. The applicant has included a provision for advanced conservation practices in their adaptive management and changed circumstances to address
    b. The Service has added an evaluation of detection and avoidance measures into Chapter 2 of the EIS.
4. A call to address take occurring at non-MEC turbines more thoroughly in the FEIS and provide a continuous update to the cumulative effects analysis during the permit term.
    a. Chapter 5.2 of the EIS describes how we have attributed potential take to existing wind facilities and projected build out. We have accounted for the possibility of currently ongoing and future bald eagle fatalities from wind turbines in the affected eagle management units, and incorporated these assumptions into our evaluation of cumulative effects. Given that the applicant is conducting mitigation, we expect that their take would not add to the cumulative effects to bald eagle populations in the region. Also, if eagle take is occurring or occurs in the future at other facilities, and those operators pursue a permit, the Service will provide another cumulative effects analysis with each subsequent permit. The Service continuously tracks bald eagle fatality rates from various sources, including wind energy, through the "Cumulative Effects Tool". Lastly, the Service's Findings Document and Biological Opinion will address cumulative effects in the context of the preservation standard in BGEPA, as directed by 50 CFR 22.11.

The Nature Conservancy

The Nature Conservancy provided comments with recommendations related to the incorporation of existing landscape plans into conservation measures and the implementation of mitigation. Other comments related to future wind development were also included in the comment letter. The Service's response to these comments are provided directly below the specific comment.

1. The recommendation that MEC incorporate an analysis of habitat range for the covered species and reference this data with existing landscape-level plans, such as the State Wildlife Action Plan, to inform priority areas for avoidance and minimization measures.
    a. The applicant has chosen to rely on fatality data collected from the projects and statewide species-specific surveys to inform priority areas for conservation measures for the covered species.
2. The recommendation to increase the reduction in take beyond the 35% identified in the HCP, in an effort to get closer to the 93% reduction Bat Conservation International identified during cut-in speed studies.
    a. The applicant has proposed conservation measures that they believe are commensurate with the taking of covered species. The Service will evaluate whether or not the application has met the issuance criteria for a permit, including the criteria to minimize and mitigation to the maximum extent practicable. The Service's evaluation will be included in the findings document.
3. The recommendation to provide for the ability for INHF to subcontract and/or work with other entities to accomplish the mitigation.
    a. The applicant intends that INHF will have the opportunity to work with other entities for mitigation implementation, as warranted. This has been clarified in the HCP.
4. A concern that the proposed artificial roost structures will not provide mitigation for ESA-listed bats, and that tree plantings will not mitigate for ESA listed species within the first few years.
    a. Mitigation actions, including targets for restoration, preservation, and timing of implementation have been clarified and expanded upon in the final HCP.
5. A recommendation that small winter populations of Indiana bats be targeted for mitigation actions.
    a. Neither the Service nor MEC is aware of any currently unprotected small colonies of wintering Indiana bats within the state of Iowa. However, we will take this comment under advisement, should new ones be discovered during the course of the mitigation implementation.
6. A recommendation to establish a more conservative trigger point than 90% reduction in populations to trigger the changed circumstance in Section 8.2.2.
    a. The applicant has evaluated this trigger and has revised this value to 80%.

Sierra Club

The Sierra Club provided several comments with specific requests for action that are summarized below. The Service's response to these comments are provided directly below the specific comment.

1. A statement that the Service mischaracterized the Purpose and Need statement in the EIS.

a. Thank you for your comment regarding our purpose and need statement. We believe that the purpose and need as stated in the EIS is sufficient under the National Environmental Policy Act (NEPA). Furthermore, the Service followed the directives given for Purpose and Need development in the 2016 HCP and ITP Processing Handbook published by the Service and NOAA. Since the commenter did not provide an alternative purpose and need statement for the Service to consider, the Service cannot respond further on the comment relating to the purpose and need statement.

2. A request to add an Alternative in the EIS that would include alternative siting of wind turbines
    a. The Service does not have the authority to regulate the construction of wind farms. All of the projects were constructed regardless of the issuance of a permit. An alternative including different turbine sites would have required the complete deconstruction of the turbines and their rebuilding elsewhere. We do not have any information to suggest that changing the site of a turbine would have an effect on the impacts. 40 CFR 1502.14 calls for the evaluation of a reasonable range of alternatives. Reasonable alternatives are further defined as "those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" as stated in the "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (https://www.energy.gov/sites/prod/files/G-CEQ-40Questions.pdf). We believe that the relocation of existing turbines also does not constitute a reasonable alternative for this project. We have added this explanation regarding alternative siting of turbines in Chapter 2 of the EIS.
3. A statement that the application for an incidental take permit should be/should have been submitted prior to the construction of turbines.
    a. The Service does not regulate the siting of wind turbines under ESA. Also, the Service cannot require any entity to pursue incidental take coverage, as clarified in the April 26th 2018 Memo from the Principal Deputy Director.
    b. The proposed activity is the taking of covered bat species by the operation of wind turbines, not the construction of the facilities themselves.
    c. Likewise, BGEPA and implementation regulations do not have specific provisions for the regulation of siting of turbines (50 CFR 22).
4. A request to consider the issuance of a permit with a shorter term than 30 years, such as for 5 years, with the concern that a) WNS may impact bat populations b) the amount of permitted take for both eagles and bats may need to be reduced
    a. The Service has revised the discussion of the issuance of a shorter term permit in Chapter 2 of the EIS. Furthermore 50 CFR 17.22 and 50 CFR 17.32, states that "…the Director shall consider the duration of the planned activities, as well as the possible positive and negative effects associated with the permits of the proposed duration on listed species…" A shorter term permit does not meet the need of the applicant to be permitted for the operational life of the projects. From an impacts perspective, a longer term permit provides for a larger amount of mitigation to occur upfront, which is particularly important to consider for forested habitat restoration and enhancement projects. The applicant is implementing annual monitoring and has incorporated a 5 year check-in to ensure that take levels are in compliance with the permit, and/or trigger adaptive management measures to reduce take levels if needed. Changed circumstances also

provides for a reduction in bat populations and measures to reevaluate impacts to covered species when that occurs.

5. Specific recommendations for adaptive management measures, including selective curtailment of selected turbines during periods of increased bat or eagle activity, requiring MEC to move turbines causing the greatest loss of eagles and bats, and increased on-the-ground monitoring of bat and eagle activity.
    a. Adaptive management measures are outlined in Section 5.5 of the applicant's HCP, and include options for selective curtailment of turbines, decreasing the cut-in speeds at select projects, annual evaluation meetings to determine permit compliance, and a 5-year check-in procedure for evaluating whether or not adaptive management actions are warranted. We have evaluated the applicant's HCP and whether or not the measures proposed in the HCP meet the standard of maximum extent practicable, per the section 10(a)(1)(B) issuance criteria. Our conclusions can be found in the findings section of the Record of Decision.

Comment #	Date	Author	Comment	Response to Comment
2.1	9/24/2018	Amber Christenson	Wind energy companies should NOT be allowed any exemption for the taking of birds or bats. I strongly oppose any allowance given to harm the fragile ecosystem or habitat. It is illegal for me to kill a bird, unless I buy a hunting permit and am limited to how many and what species I can hunt.	Thank you for your comment.
2.2	9/24/2018	Amber Christenson	Also Wanton Waste law should apply to everyone. Wind turbines are nothing but bird choppers and bat killers. We need birds and bats to control our insect populations and protect our fragile ecosystem. No execptions.	Thank you for your comment. An evaluation of bats as they relate to insect populations has been added to Chapter 3.3 of the EIS.
3.1	9/24/2018	Rachel Terhaar	We live and ranch in rural Madison County Iowa. There is a legal and moral battle waging in our county because MidAmerican Energy Company has pushed its way in, despite the will of the majority of residents. With 53 industrial wind installations already, they are not forthcoming about how many more are intended, but we can see from our neighbor Adair County that it could end in the upwards of 600-plus. A coalition has formed to oppose this and ask our county for a moratorium until it can be determined that all the negative impacts of these are fully evaluated. Our 5-member Board of Adjustment in a split-vote, accepted the current proposal for the building of 52 more 494ft tall turbines in an even MORE densely populated section of this county. We have presented so much researched evidence over the course of the past 6 months to our county officials and plead with them to not subject people, animals, birds, to the STACK of negative evidences and the reality that industrial wind is NOT green nor sustainable without the government subsidies! Not to mention taking prime agricultural land out of production, having authority over people's land for the duration of the contract, and paying neighbors hush money to keep quiet about the nuisances and health impacts! https://www.wind-watch.org/documents/top-10-myths-about-wind-energy-and-birds.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
3.2	9/24/2018	Rachel Terhaar	There has been such a resurgance of bald eagles in our county. We believe that any birds, bats, raptors that are killed by turbines are scavenged by predators before they can be counted as "takes". That is common sense to rural people.	The methods for estimating take and accounting for searcher efficiency and carcass removal rate are provided in the HCP. The Service does not know of any other available methods that are proven to increase the accuracy of fatality estimates.

Comment #	Date	Author	Comment	Response to Comment
3.3	9/24/2018	Rachel Terhaar	When I contacted our county conservation officer upon learning of this proposal for more turbines in this county, I asked his opinion on the effects on birds and wildlife. At that time, he had NOT even been notified or inquired of by the county about the proposal. He said he assumed that the county would eventually get him the memo after their decision had been made and that he assumed that MidAmerican had already done the local studies to prove no harm to birds & wildlife. Come to find out differently. How is it even possible that the energy companies are given an exemption to the documented killing of our national birds when it is a felony crime for anyone or anything else that would intentionally or unintentionally kill a bald or golden eagle?! How is that right?!	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
3.4	9/24/2018	Rachel Terhaar	The bottom line is that the energy companies don't have to be regulated. The neighbors do not get a choice in living near these machines for the rest of their lives. The public is fooled into thinking they're environmental. There is no shortage of fossil fuels that warrants this failed experiment to go on, causing mortality to avian species and harm to individuals and property values. Your experts could do well in utilizing the data that has already been collected and the research already done by many states in the U.S.	Thank you for your comment.
3.5	9/24/2018	Rachel Terhaar	MidAmerican has proven that they will resort to deception. They have told neighbors that they should get a jump on another neighbor who plans to sign for turbines on their land. It is later discovered that the "other neighbor" had declined the offer. The WHOLE reason that they are attempting this mitigation is because it has been exposed by activists that there hasn't been sufficient research in this state. For more information on the local Coalition, please see our FB page: Rural Rights Coalition of Madison County. See what good people, minding our own business and taking care of the land for future generations have had to go through with financial and personal COST! MidAmerican's ads say "relentlessly on your side" - they are on their OWN corporate greedy side. They retain a number of lawyers because there is ongoing trouble for them as regards wind installations. Some counties have had success in getting turbines removed.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
3.6	9/24/2018	Rachel Terhaar	The setback distances from homes and property lines are at a bare minimum. Where CAN these things be placed to incur the least harm and damage to life and property? Even if the subsidies run out and aren't renewed, there is a phase-out period and MidAmerican will keep plugging up our landscape with them. Observe any number of fields of these and you will always see some not running. The maintenance must be a significant problem. If there has to be periods of the day that they don't run in order to protect birds & bats, then they are even LESS economically beneficial. This makes no sense. Please be discerning in what is really going on under the surface with all of this and do NOT allow them to continue this travesty to our living things!	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
4.1	10/9/2018	Shelley Marsh	I am HIGHLY OPPOSED to the approval of MidAmerican Energys request for an Incidental Take of our protected Bald Eagles and Endangered and Threatened Bats! This Wind Energy has become an overlooked situation, it is highly political and all about the production tax credits for wealthy energy companies to get out of paying taxes at our wildlifes and our expense. Energy companies like MidAmerican Energy spin their stories of Clean Energy and being Green The truth is coming and what they are touting is far from the truth! MidAmerican Energy hires experts to evaluate and inform the public, county administrators, and other regulators of all the good and skew the harm factor greatly to their benefit! It is time we wake up to the fact Wind Energy is not what its touted to be reducing less than 1% of the CO2. They use tons of fossil fuel to make, transport, prepare for them, place, secondary back up is needed by fossil fuel, and to decommission them. Our Earth will be left with tons and tons of nonrecyclable toxic waste from the blade structure alone! They use rare earth minerals mined in China for the turbine magnets causing pollution and harming our Earth, Water, and Air! We do not need Wind Energy Period! There has to be a safer, less invasive, less harmful, more efficient, more effective way of renewable energy! This continued allowance of harm to our environment and ecosystem should stop right here! To allow MidAmerican Energy yet another admittance to harm our wildlife, environment, and ecosystem is shameful! It cannot continue! Please say NO MORE we will not be part of this process we will protect our Bald Eagles and Bats! We = cannot let this be all about moneypeople already take our environment and ecosystem for granted! It's time to not look the other way! Our Bald Eagles are our nation's symbol many people have given their lives for this patriotic symbol. How shameful is it for a company to ask to be able to kill legally yet MORE of our nations majestic symbol!	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
4.2	10/9/2018	Shelley Marsh	Just over the past few years we have had the opportunity to see Bald Eagles soaring in our skies and over our rivers and lakes! Please do not allow this large private owned corporation the permit to reduce these numbers! Eagles and birds of prey are attracted to the dead birds and bats under or thrown close by the wind generators, this increases the opportunity for more kills. MidAmerican Energy can say they will require landowners to discard the dead carcasses, but there is no guarantee this will happen and most likely will not. Who will monitor this requirement and who will hold MidAmerican Energy to see that it is done. This is so wrong!	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
4.3	10/9/2018	Shelley Marsh	Bats are so underrated! People have no idea how valuable Bats are to our environment and ecosystem! The majority of bats eat night-flying insects, including many agricultural pests. As the primary predators of night-flying insects bats play a significant role in controlling insect populations. Estimates from studies show that some bats eat more than 70% of their weight in insects each night and some pregnant females at 100% of their body weight (thats a lot of insects!). Another way of looking at it, taken from an example on the Bat Conservation International website, is that: A single little brown bat can eat up to 1,000 mosquito-sized insects in a single hour. Leading to speculation about their role in controlling mosquitoes which may reduce the spread of West Nile and other vector borne diseases. We have recently had an increase in West Nile in our area. This very well could be from the over 2,000 wind generators MidAmerican Energy has placed and are planning at least 500 more in our area alone! Bats are vital to our agriculture pollinating and dropping seeds of over 500 species of plants. People cringe when they see bats because they do not realize the importance of them! We will continue to educate people of their importance! With the take of Bats the need for more pesticides will become a reality. Pesticides drift for miles and its a well known fact many cause cancer. http://www.batswithoutborders.org Human adults and children will be affected negatively by the allowance of the incidental take!	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into Section 3.3 of the EIS.
4.4	10/9/2018	Shelley Marsh	Then there is the owls and the migrating birds, snow geese, Canadian geese, pelicans, swans, migrate through our area, we look forward to their arrivals every year! Wind Energy opposition is becoming a major movement because of the harm it does. Please do not add to this harm. We do not need MidAmericans wind energy period. These are being forced on us in masses and will take so many more birds and bats than will ever be recorded and reported! Please do not approve MidAmerican Energys Incidental Take permit! Protect our environment, ecosystem, wildlife, humans, and our future! Do not feed into the fallacy of the greenness, cleanness, and the need for wind energy and the need to be permitted to kill our birds and bats! Please say no!	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
5.1	10/12/2018	Jim Wiegand	The Service has received an incidental take permit (ITP) application from the MidAmerican Energy Company in accordance with the requirements of the Endangered Species Act, as amended (ESA; 16 U.S.C. 1531 et seq.). The applicant has prepared a draft habitat conservation plan (HCP) in support of the ITP application and is seeking authorization for take of the federally endangered Indiana bat, federally threatened northern long-eared bat, and federally protected bald eagle, in addition to the little brown bat and tricolored bat. Little brown bat and tricolored bat are not federally protected, but they are currently being evaluated for protection under ESA. The applicant has chosen to include these as covered species, and they will be treated as if they were ESA listed. The ITP, if issued, would authorize incidental take of these species that may occur as a result of the operation of wind facilities in 22 Iowa counties over a 30-year permit term. The draft HCP describes how impacts to the covered species will be minimized and mitigated. The draft HCP also describes the covered species' life history and ecology, biological goals Start Printed Page 44653and objectives, the estimated take and its potential impact on covered species' populations, adaptive management and monitoring, and mitigation measures. The Service has prepared a draft environmental impact statement (DEIS) in response to the ITP application in accordance with requirements of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.). We are making the draft HCP and the DEIS available for public review and comment. This statement from the Service is particularly deceptive because fatalities WILL absolutely occur to all flying species that must share habitat with MidAmerican wind turbines. ..The ITP, if issued, would authorize incidental take of these species that may occur as a result of the operation of wind facilities in 22 Iowa counties over a 30-year permit term. What would the comments for this application look like and how many thousands more comments would the US Fish and Wildlife Service receive if there were no deception, gross dishonesty and truly scientific information was being provided to the public for this entire process? How many Bald Eagle, Golden Eagle, Whooping Crane, and Indiana Bat carcasses have already been picked up by USFWS agents or received by the Denver Eagle Repository from MidAmerican wind energy facilities over the years without incidental take permits? How could there ever be any credible Habitat Conservation plans when so many facts and so much mortality is being hidden from the public? The Fish and Wildlife Service (FWS) Notice: Draft Environmental Impact Statement and Draft Habitat Conservation Plan; Receipt of an Application for an Incidental Take Permit for Midwestern Bat and Bird Species; MidAmerican Energy Company, Iowa if One thing is certain, all plans and alternatives suggested by the Service with this permit application should be thrown out until the Service actually provides credible research to the public. For years the Service has chosen to ignore my scientific input . But this is not because Im not a credible source of information, it is because they lack accountability and have the power to hide the truth. Enclosed are a group of articles that absolutely discredit the accuracy of the data being used by the Service. These articles also expose some of the numerous unscientific research methodologies that were used in the wind energy mortality studies to obtain this false data. This bogus information has been incorporated by the US Fish and Wildlife for this draft environmental impact statement (DEIS).	Thank you for your comment. This office has no experience with the items in the enclosed articles from other states and countries. The pre-permit studies conducted to inform the HCP and EIS were designed and executed in close coordination with the USFWS. The methods and results of the data have also been evaluated by the Service for integrity.

Comment #	Date	Author	Comment	Response to Comment
6.1	9/5/2018	Anonymous Anonymous	Agency should review Radioactive import steel should be concern of national regulatory authorities . Strengthen the mechanism adopted for certifying radioactivity free steel materials that is import to USA. Harmonized level of standards for acceptance of contamination in steel products should be developed . radioactive contamination in steel would be anything showing radiation level above natural background radiation level, and above the exempt (activity concentration and total activity) level of IAEA. Main radioisotope of contamination is Co-60 of industrial use. Metals identified contaminated are rods, flanges, valves, door pull handles, man hole covers, nails, coils, bright bars, billets etc. the growing global threat of contaminated scrap metal. The major risk America import of steel face in our industry is radiation in steel scrap. Wind turbine imported steel, should be inspected for Radiation , many birds have been found dead around windfarms, each turbine contains more than 8,000 different components, steel, cast iron, and concrete. magnets made from neodymium and dysprosium, rare earth minerals mined almost exclusively in China. 2003 to 2008 ; Work tools such as hammers and screwdrivers, were denied U.S. entry after customs and the Department of Homeland Security boosted radiation monitoring at borders. Steel, iron, Cobalt, Rare Earth Elements (REF) and lithium and should be added to the 3TG conflict minerals law, 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act Title XV: Miscellaneous Provisions - Section 1502 Conflict Minerals (P.L.111-203) as well as US tariffs ; Section 232 under the authority of the Trade Expansion Act of 1962. the United States companies materially injured by reason of imports of materials, by reason of unfairly traded imports . Countries that mine and manufacture lack of visibility down the supply chain that leaves companies exposed to the breadth of social and environmental issues . In 2009 report shows Germany got 150 tons of steel items imported from India which were contaminated with radioactivity, a leading newsmagazine said. 1998, 430,000 pounds of steel laced with Cobalt-60 made it to the US heartland from Brazil. United States has no regulations specifying what level of radioactive contamination is too much in raw materials and finished goods. Mandatory radiation monitoring of the incoming raw material and finished products in the steel factories using scrap metal as input material should be introduced through suitable national legislation. US and state governments do not require scrap yards, recyclers and other businesses to screen metal goods and materials for radiation or report it when found. Federal agency is responsible for oversight of manufacturers and dealers from countries are exporting contaminated material and goods. Radioactively contaminated scrap threatens both human and wildlife health and environment. Report showed China-made grater bearing in a brand name was laced with the isotope Cobalt-60. Flint, Mich., scrap plant discovered a beat-up kitchen cheese grater that was radioactive. Brazil 1998 import to America, Cobalt-60 tainted a 430,000-pound shipment of metal. Part of that load found its way to Michigan and then Indiana, where it was used to make brackets for chairs. India radioactive metal found to be used by a Connecticut company. Mexico: Construction reinforcement materials from Mexico laced with Cobalt-60 that were detected at the border in 2006. US Government Accountability Office, which put the number of radioactively contaminated metal objects unaccounted for in the United States in 2005 at 500,000. Others suggest the amount is far higher. 2015 China in South America Mining Ecuadorian Foreign Minister Ricardo Patio stated at the close of the third summit of the Community of Latin American and Caribbean States (CELAC) in Costa Rica 2015. Said The United States is no longer our privileged partner, now the privileged partner is China. , Larger electric vehicles with steel Cobalt and Lithium can have higher lifecycle greenhouse gas emissions than smaller conventional vehicles." MIT data substantiate a study from the Norwegian University of Science and Technology .	Thank you for your comment. The USFWS does not have jurisdiction over the steel associated with wind turbines. Our federal action under this notice is the decision to permit the taking of federally protected species

Comment #	Date	Author	Comment	Response to Comment
7.1	9/14/2018	Karen Frantzen	WHAT?! This Warren Buffet company, MidAmerican Energy in Iowa, wants us to say it's OK to kill - for THIRTY YEARS - our national bird, along with other creatures - because of wind turbines? I think NOT! First of all, the economics aren't there for wind turbines - without substantial taxpayer subsidies. Second - There is a terrible effect from flicker along with sound, ice flinging in winter, etc etc... They are just a bad idea. Not to mention various fires, and other maintenance issues, etc. Extremely few jobs are created with these monstrosities. Look at Europe, etc. They are decommissioning WTs. Been there, done that. Economic drain. And why? They only provide energy, at best, 20% of the time, and then not at peak load times. It's a peak times that we need a stable source of energy. Wind absolutely does not do that. WTs must be paired with back up systems, to compensate for variations and to stablize the grid. There are HUGE transmission line costs. It costs several million dollars to install, much less maintain, a large turbine. We US taxpayers subsidize much of these costs. Millions and millions of dollars, if not more. :(And now this, permission to have an "incidental take" - read KILL - permit for our national bird. Really? NO! I say NO! Just NO!	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
8.1	9/14/2018	Tina Graziano	Incidental? No. Its premeditated killing. We all know what the industrial wind turbine industry does to our winged wildlife. There is no kind of repellent applied or used to warn the winged wildlife of collisions, or in the case of bats, Barotrauma, getting too close, period. This country, years ago decimated the eagle population into almost extinction because of the use of DDT. Finally, we have been able to repair this devastating mistake, and bring back our beloved raptors.	Thank you for your comment.
8.2	9/14/2018	Tina Graziano	I refuse to support this industry, as the damage it causes to our environment is monumental, and cannot be repaired. Forests, and agricultural land is being eliminated, never to be brought back. Industrial wind will never produce any viable benefit that will out weigh the massive destruction is causes. Please do not approve any type of "take permit."	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
9.1	9/14/2018	Brent Steffen	It is ludicrous that we would consider the take off multiple endangered species as well as eagles for the financial benefit of wind energy developers. Wind energy is not financially sustainable were it not for taxpayer subsidies and is environmentally corrupt on many levels extending from the location of industrial wind turbines to their site of origin in China where rare earth minerals are mined. Please do not further sacrifice our environment and endangered species to this boondoggle.	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service evaluates these criteria at the time of the permit decision.
10.1	9/14/2018	Kathryn Barnes	I am against regulations that do not adequately protect endangered species. Bats do not fly in heavy wind. Bat deaths could be minimized by not placing wind turbines in areas that have mild wind speeds and it is not right that a permit for "takings" be allowed. Instead areas where endangered species would be killed should be avoided! I am against government sanctioned deaths of endangered species. Corporations should not be allowed to break protective laws. Those laws are in place for a reason.	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service evaluates these criteria at the time of the permit decision.
11.1	9/14/2018	Jacob Newton	I think at first we need better, independent monitoring of these species in the state first and foremost before we start handing out permissions for incidental take permits.	Thank you for your comment. The pre-permit studies sought to gather information about the covered species across Iowa and will be used to evaluate the context and impact of the requested take.
11.2	9/14/2018	Jacob Newton	Also I think we need better siting regulations to preclude power companies from extending turbine facilities through massive chunks of already greatly degraded habitats especially in states like Iowa where we already have turbine fields abutting against wildlife management areas, waterfowl production areas, and other patches of very limited habitat; which are literal magnets for avian and bat species that get funneled through the turbine fields. So I would be greatly against any permit for increased incidental take. Largely because incidental take permissions will allow companies to ignore the environmental impacts of their activities rather than force them to find appropriate design and engineering fixes to the problems that turbines currently have vis-a-vis avian and bat populations.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
12.1	9/14/2018	Tammy Baier	Adair county is looking at 500 up to possibly 1000 turbines and we have a lot timber in Adair county. We personally live on a bald eagle feeding area. Last winter we had 20 bald eagles landing in one of our pastures almost daily. I also know we have several species of bats in our timbers too. I think it's wrong to endanger so many endangered species just to make Warren Buffet richer!! And yes, Mid American is a private business that is for profit. When is the regulations that are currently set in place for a reason, to protect human and beast going to be observed and not be overridden just because a mega corporate energy business wants to move in??? This is so wrong!!! I truly feel that the government is so paid off by Warren Buffet that you will do anything even break your own laws just so he'll keep padding the pockets of the government. Mr Buffett has more power than the US President himself!! That is scary!! Wake up! If I were to shoot a bald eagle on the same farm that the wind turbine was on, I'd be fined and thrown in jail but you are forgiving a for profit company? What part of this is ok???? Do the right thing. There are so many places in the US that don't have bald eagles, and endangered bats, the best farm land in the world and not as populated area as Iowa. Put them there!!!!!!!!!!!!	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
13.1	9/24/2018	R. Ross Gipple	I live in Iowa, the most biologically altered state in the US. And I live in a world where only 4% of the mammalian biomass is wild...humans and our domesticated animal entourage make up the balance. Bats are the only mammals that fly and are often misunderstood and under appreciated. Humans have over domesticated planet Earth and we are consuming far more than our proper share. We never seem to get enough of that which is really not needed to be happy. After 75 years in this place, I am now witnessing the urbanization and industrialization of a once rural countryside. We do not need a larger supply of energy, but we do need to focus on reducing the demand for energy. Wild nature is self-regulating. Modern humans must also learn to self-regulate, before it's too late. MidAmerican's take application must be denied.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
14.1	9/24/2018	Donna Nail	Please save our bats and eagles. It astounds me how our state lets the wind companies walk all over us. I live in Kossuth county and they are trying to take over my county as well. The wind companies are taking our prime farm ground and ruining our landscape. They have no regard for our health and well being so why would they care about our endangered species. DO NOT let MidAmerican have a permit to kill our bats and eagles. MidAmerican has gotten away with too much already. Hold them accountable for their actions.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
15.1	9/24/2018	Anonymous Anonymous	I am opposed to the issuing this incidental take permit to Midamerican Energy. After many decades of improvents made to environmental conditions encouraging the Raptors, and Eagles in particular, it would be a severe and permanent detriment. It was not until the last 10 years that we have seen the population rebound in our locale. It is not unusual to see Hawks and Eagles each day. After Midamerican has been operating the wind turbines for quite some years now, it testfies to be an admission that they do kill. If people are not aware, there are hundreds of projects in the works that are not one or or two turbines but literally hundreds in a 20 mile radius in each site. In those areas there is no escaping them by any flying species. I have been in the midst of several of the wind turbine sites due to my job. I can tell you from seeing this with my own eyes that the bird populations are greatly reduced and it's due to the fact that that they cannot survive where wind turbines are	Thank you for your comment.
16.1	9/24/2018	Anonymous Anonymous	just so you know the Alaska Region borders 663,268 square miles of land, and has more than 80,000 tribal members that make up 229 federally recognized tribes. Thats almost half of the tribes in the United States. Maintaining regular contact with Alaska's Native organizations, Tribal Governments, and communities, Tribes need more dam construction for fishing. Stop removing dams , and stop these wind farms they are hurting tribes and killing the wildlife birds and bates and wildlife habitat . they contain toxic minerals. national parks are a mess, huge deferred maintenance issue. major eye sores from past 6 years management, need new management in parks.	Thank you for your comment, however this project is in Iowa.

Comment #	Date	Author	Comment	Response to Comment
17.1	9/24/2018	John Schultz	Please do all you can to eliminate the threat of wind turbines being built all across the state of Ohio and being placed in lake Erie. These turbines pose a well documented threat to bats and birds. If enough of our bats and birds are killed off the mosquito population will rise. The only alternative is to increase the use of pesticides to control them and the diseases they carry. This would further harm our wild life and pollute our water. As for the hundreds of turbines proposed to be located in lake Erie that is an unimaginable nightmare for both the commercial and sport fishermen both of which generate millions of dollars for Ohio. PLEASE DO YOUR PART IN HELPING TO PROTECT OUR STATES NATURAL RESOURCES. Thank you. John Schultz. [address censored].	Thank you for your comment. This action does not include any wind facilities in Ohio or Lake Erie.
18.1	9/24/2018	Melissa Lynch	Migratory birds are important to our environment, the beauty of our nation, and to me as a citizen. I ask you to protect them against commercial wind turbines.	Thank you for your comment. No permit mechanism currently exists to permit take of migratory birds.
19.1	9/24/2018	Anonymous Anonymous	As an organization in charge of wildlife, why would you even consider allowing an organization to kill off all the birds and bats as they think they need to . If a private person did such they would be fined and enormous amount of money as a fine for doing such. Any company should be held just as accountable. I would think your service should be protecting the wildlife. DO NOT ALLOW PERMISSION FOR INCIDENTAL TAKE.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
19.2	9/24/2018	Anonymous Anonymous	Now for the environment one turbine puts about 240 tons of CO2 into the atmosphere. Another approx. 1200 tons form making the concrete of CO2 into the atmosphere. However it is never mentioned how much CO2 is emitted into the air from all the diesel fuel used in the mining and the transportation of the ore to the foundries and back to the manufactors and then again hauling the finished steel and copper to the sites. Diesel fuel puts over 22 pounds of CO2 into the air for every one gallon of diesel fuel. Think about that. Suppose that has something to do with global warming? One company says they already have over 2200 turbines now in Iowa. Think of all the CO2 already in the environment to affect our weather	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
20.1	9/24/2018	Ray Hohman	Our wildlife in NW Ohio is way more important to me , my neighbors and my family than helping big wind line their pockets. Not to mention the ruining of our peaceful landscapes.	This federal action is limited to Iowa and does not include Ohio.

Comment #	Date	Author	Comment	Response to Comment
21.1	9/25/2018	Diane Darr	Seriously, are we going to let Mid American turn back the clock on years of effort to protect our eagles,raptors, bats and numerous other birds? Not to mention the other damage being done to the land and tile systems put in place long ago. And for what? Greed and the foolish notion that wind is going to solve everything. If not for government subsidies wind turbines would not be going up. They will be a blight on the land forever long after their use is over. The large companies putting them up could care less about the land or people who have to live near the turbines. For every wind turbine putting electricity on the grid (when the wind blows) there needs to be an alternate source of energy to take up the slack when wind power is not being produced. I have learned from personal experience that a well funded and aggressiv lobby can sway those in power. Please do not allow the environmental damage proposed.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
22.1	9/27/2018	Darci Adam	I understand that this is an effort in futility, despite the lines above that read, "Thank you for taking the time to create a comment. Your input is important." This really is not true but I will take the time to comment none the less in order to have my concerns added to the record. My family lives in the Crocker Hills of South Dakota, an area of the midwest which is currently being covered with wind "farms". My family and other concerned neighbors have been opposing the project in our area as well as other areas where industrial wind facilities threaten the environment, economy, and health of the area. The Crocker Wind Farm was approved and permitted this summer by the SD PUC, and the project had the stamp of approval from USFWS. This federal agency completely sacrificed the environment they are charged with protecting when they just recently issued their FONSI - Finding of No Significant Impact report. This occurred despite the fact that many people/agencies called and spoke with various employees of USFWS and wrote in to comment on the Draft Environmental Assessment. This occurred despite the fact that solid evidence was presented at the SD PUC Evidentiary Hearing showing that this area is NOT appropriate for a wind "farm" because it is a critical environmental habitat for many birds (especially migratory birds), bats, bald eagles, butterflies, and the list goes on. This Prairie Pot-hole Region is unique. The area is covered with grassland and wetland easements. Yet the service agreed to allow industrial wind towers to be build on the very land that was signed up to be protected. Yes, it apparently is okay to build wind turbines on easement lands if the developer simply trades one acre for two. These native prairie grasslands are disappearing across the United States. They can never be reclaimed and once again become 'unworked native prairie'. The USFWS knows it. Yet Barbara Boyle, Will Meeks, Noreen Walsh, and Bradley Johnson, signed off on the permits. From the Department of the Interior down to the local/regional offices, it is abundantly clear that employees of the United States Fish and Wildlife Service have been influenced by Big Wind and no longer care what happens to the environment. Who will protect if USFWS does not?!	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
22.2	9/27/2018	Darci Adam	Why is this idea of a Midwestern Bat and Bird Species "Incidental Take Permit" even a consideration? (And don't think for one minute that sterilizing the name of the permit somehow changes what it is - a permit to deliberately allow the killing of creatures that cannot advocate for themselves.) This is unconscionable! It is USFWS's DUTY to respond in a manner which supports the Services mission to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. Do not approve this permit. Someone, take a stand!	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
23.1	9/18/2018	Tilford Egland	I understand MidAmerican is seeking to get a permit to kill off wildlife, birds in particular. I am absolutely dead set against a permit that would allow them to do that. I would think also that you as a protector of our wildlife you would protect the wildlife that we do have left. You probably know about all the eagles that have been killed in California, why would you allow that to happen here in Iowa? This is just greed for the love of money to put in turbines.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
23.2	9/18/2018	Tilford Egland	As a environmental watchman you should look at the CO2 that is contributed to the atmosphere, not in the operation of the turbine, but in the mining of the ore, all the diesel fuel used to transport the ore the finished product to the location. Consider all the fuel being used in all the operation of these projects. Check the concrete, steel, copper, blades, CO2 contribution to the atmosphere. The amount of CO2 emitted is unbelievable. Could this lead to global warming? So please do not allow this permit to be given to MidAmerican.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa. Therefore, the CO2 associated with the construction of the turbines is outside of the scope of this EIS.
24.1	9/27/2018	D.S.	Regarding MidAmerican Energy's permit request to "Take" the federally endangered Indiana Bat, federally threatened Northern Long-eared Bat, federally protected Bald Eagles, also the Little Brown Bat, and Tricolored Bat; NO! NO! NO! DENY! DENY! DENY! MidAmerican Energy has over 2,000 turbines, If each turbine killed just one eagle a year for the next thirty years that is 60,000 Bald Eagles. Even half that many is too many. I shudder to think how many bats would be "taken". From articles I have read concerning wind farms both here and abroad, once energy companies have "taken" over the permitted level, it is just requested to "Raise the Limit". We have Bald Eagles fish our creek and pond and we enjoy watching them. Our farm is also included in MidAmerican's "Bat Habitat" map. We also enjoy the antics of the bats in the evening as they fly around our yard lights eating insects.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
24.3	9/27/2018	D.S.	Two turbines are proposed on property right next to our property line. Both turbines will be less than a quarter of a mile from the pond which hosts migrating geese, swans and pelicans. NO! to MidAmerican's "Take" permit.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
25.1	10/1/2018	Gerry West	MidAmerican is applying for their first take permit after 20 years of running wind turbines in Iowa, in violation of the law. This is likely because they have been skirting regulation by avoiding receiving the proper approval of the Iowa Utilities Board. Who can kill our endangered species for years and then apply for a permit once they are under legal scrutiny and get away with it? Nobody, I hope. Will they be held accountable and fined for the bats and birds that they have taken over the last 20 years? This wanton, purposeful disregard for the law should not be allowed to go unpunished.	Thank you for your comment.
25.2	10/1/2018	Gerry West	In Humboldt County, where I live, the USGS comprehensive study on the economic impacts of bats states that the value of bats standard value is 18.5 million dollars. This is smallest county in Iowa with 248,000 acres of harvested land. I would estimate that Mid-Americans 2000+ turbines in Iowa take many more acres than that out of production. So over 20 years, how many bats and birds have they killed? They have probably cost Iowa farmers at least that much every year. So, my conclusion is that they should be heavily fined for their past actions and if a permit is going to be granted, going forward, that is should be with the strictest regulations possible.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.
25.3	10/1/2018	Gerry West	Since it is a known fact that a wind turbine will never generate enough energy, in its lifetime, to offset the energy consumed to manufacture and put it up why are we allowing the travesty to continue? The only thing about this whole scam that isnt a lie is the damage they do to wildlife. You have some control over that if you dont bow to the large sums of money and power behind this scam	Thank you for your comment.
26.1	10/1/2018	Dean Gunderson	I am objecting to the "incidental take permit" for Midwestern bat and bird species which was applied for by MidAmerican Energy. I "do not" think they should be allowed this permit. MidAmerican Energy claims to be all about the environment yet they have no problem in the "taking" of these living species. These birds and bats are a crucial part of the ecosystem in which they thrive. To allow MidAmerican Energy this permit for the sole reason of making money for their investors would be a huge mistake. I am again asking you "not" to grant this permit to MidAmerican Energy. Thank you for your time and careful consideration.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
27.1	10/2/2018	Heather Bernhard	As a registered voter, family-farmer, resident of Iowa and concerned citizen, I respectfully request that the United States Fish and Wildlife Service deny request by MidAmerican Energy Company for permission to take Bald eagles and a variety of identified bat species by the wind turbines they propose to construct in Iowa. Years of time and financial resources invested by the federal government of the United States of America to protect the symbol of our freedom (Bald Eagle) should not be sacrificed by permitting MidAmerican Energy Company to take any living creature nor harm the habitat and environment as a cost of doing their business through wind energy/profit efforts. Bald eagles, Golden eagles, and many other birds are protected by the United States Fish and Wildlife Service. MidAmerican Energy Company should NOT be permitted to take these birds, which are known indicators of the health of our natural resources (quoted directly from FWS website). When MidAmerican Energy Company does take an eagle, or other protected birds, due to the operation of wind turbines and/or habitat destruction of their wind farms, the company should expect the consequences (civil and criminal penalties and possible imprisonment) clearly outlined in the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act and the Lacey Act.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
27.2	10/2/2018	Heather Bernhard	State law in Iowa prohibits anyone from harming or killing bats. Bats are a critical part of Iowas environment. The state is home to nine species, all of which eat only insects. A colony of only 150 adult brown bats eats as many as 18 million crop-destroying rootworms each summer (Des Moines Register, September 8, 2018). The benefits of bat populations to the agriculture economy in Iowa and other Midwest states far outweighs the right of MidAmerican Energy Company to request permission to harm and/or kill bats with their wind turbines.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.
27.3	10/2/2018	Heather Bernhard	MidAmerican Energy obviously realizes the potential damage their wind energy turbines will cause as evidenced by filing the Draft Environmental Impact Statement and Draft Habitat Conservation Plan; Receipt of an Application for an Incidental Take Permit for Midwestern Bat and Bird Species; MidAmerican Energy Company, Iowa. MidAmerican Energy should respect the laws and standards expected of all people and organizations in the United States with no special permission/excuses/allowances granted. Period. If allowed 30-year permission to excuse the destruction of wildlife, birds and land, the irreparable damage done will not be reversible. The Bald and Golden Eagle Protection Act, the Migratory Bird Act and the Lacey Act clearly define acceptable practices as well as penalties for breaking those laws.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
27.4	10/2/2018	Heather Bernhard	The height of wind turbines, the length, speed and movement of turbine blades, changes in atmospheric pressure, wind speed and direction and, altered echolocation signals created by wind turbines imparts direct and significant risks for the navigation, health and life of all bird populations, not to mention farm ground, native prairie and wildlife habitat.	Thank you for your comment.
27.5	10/2/2018	Heather Bernhard	The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. With that mission in mind, the FWS should be working diligently to protect Bald eagles, a variety of bat species and the more than 500 species of migratory birds which spend part of their life cycles in the upper Midwest. Allowance by the FWS to build and operate wind turbines, in mass, in rural areas ultimately negates the validity of the Protection Acts and laws established and, calls into question the true mission and motivation of the United States Fish and Wildlife Service. Step up and stand firm, United States Fish and Wildlife Service, and do not allow MidAmerican Energy Company to make a mockery of the importance for conservation in our country! Do not excuse MidAmerican Energy Company from accountability! Do not confuse conservation with profit as the primary motivator behind requesting a permit to take eagles and migratory birds with no consequence for their actions. "No" is an answer.	Thank you for your comment and concerns regarding the impacts of wind turbines on migratory birds. The USFWS is an agency with deeply grounded roots in the conservation of migratory birds over the last 100 years since the inception of the Migratory Bird Treaty Act. While under the current interpretation of the act, no permit is available for the incidental take of migratory birds, MidAmerican Energy Company (MEC) have worked with our biologists to establish their "Bird and Bat Conservation Strategy" that provides guidance to the company that reduces the impact of wind turbines on migratory birds. Though it is completely voluntary, MEC has committed to implementing this strategy which includes training of staff to identify birds during incidental monitoring, among other measures. Monitoring data collected at these sites will inform the need for additional measures that MEC may implement to protect and conserve migratory birds. Also, please note that the federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
28.1	10/4/2018	Faye Schluter	I am a farmer's daughter, I have lived in Iowa all my life. One of my most memorable experiences I get to share often was the time I traveled 350 miles twice in 1 weekend to see the eagles migrating North through the Mississippi River Valley. I remember when Eagles were placed on the endangered species list and how proud I was when I saw all these eagles thriving due to the regulations, rules and diligence of the Fish and Wildlife, DNR and our local governing bodies. What do I tell my children and grandchildren when they ask me, "Why is it ok for big business to expect and be granted the privileges that are taken away from us?" " Did they have to pay all the fines like Grandpa would of?" "Why Grandma is it ok for big business to kill birds that millions of dollars were spent trying to save?" "Why Grandma didn't you do something?" This proposal is again, a continuation of different rules for large businesses in chase of profits with no regard to societal concerns. Please vote no on this proposal.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
29.1	10/9/2018	Kaye Bax	I respectfully ask that you deny MidAmerica's permit to kill. This is wrong on every level. My husband and I have been working on a cabin in a area full of wildlife. This past winter we had the privilege of watching several bald eagles around our property. Early this summer we learned there would be turbines built within a mile of our piece of paradise. Now MidAmerica has applied for a permit to kill not only these beautiful birds but bats and other birds. It is time to put this legalized killing to a stop. As a private citizen we would not be allowed to possess any part of a bald eagle yet they are allowed to kill with no penalties. I say No.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
30.1	10/9/2018	Alexis Hooper	Please do not allow midamerican to kill more birds. Last year bald eagles moved into our area. It has been over 50 year since anyone has seen them in this part of Iowa. This summer they put up 181 turbines in the area. They cut down most of the teees the eagles nested in. Please dont give this heinous company to slaughter our national bird.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
31.1	10/9/2018	David Marsh	Please do not approve Mid American Energy request for incidental take on our Bald Eagles and endangered and threatened bats. This is not right to allow them to kill more birds and bats. To kill a bald eagle is a federal law that should not be broke just for monetary reasons.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
31.2	10/9/2018	David Marsh	Wind energy has not been found to reduce any significant amount of CO2! Wind energy has come under scrutiny for claims of being green and clean Energy. It takes thousands of these industrial monstrosities to even decrease the slightest amount of CO2.	Thank you for your comment.
31.3	10/9/2018	David Marsh	Taking up prime farmland and causing visual and noise pollution. MidAmerican Energy has had way too many breaks all to reap the tax breaks from the production tax credits. It is time they go away and this throwing up as many wind generators as they can all to benefit A private owned corporation. We need our bats and birds we do not need wind generators and their harmful effects. Please put our environment and ecosystem first. There is no amount of money that can buy or replace Environment and ecosystem. Protect our county and us also. Thank you	Thank you for your comment.
32.1	10/9/2018	Brenda Standley	Please do not approve this permit for Mid Americn energy. Never should there be an instance that wildlife or habitat should be sacrificed for big wind farms.	Thank you for your comment.
33.1	10/9/2018	Grace Coleman	There should be no "incidental take" of bats and birds. Turbines kill birds - that is just a fact, so companies should be forbidden from being erected wherever there are birds dwelling or in their migration path. If an ordinary citizen destroyed as many birds as industrial wind turbines do, they would be fined and jailed. Say no to this application	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
34.1	10/9/2018	Anonymous Anonymous	Please do not approve Mid-American Energy request to increase their incidental take permit for Mid-western Bat and Bird species!	Thank you for your comment.
35.1	10/12/2018	Donald Jones	I want to vote NO on wind energy.	Thank you for your comment.
36.1	10/15/2018	Anonymous Anonymous	It is my understanding that Mid American Energy violated the Madison county ordinances to fast track this application and by- passing the home owners and land owners in the area. It is also my understanding that due to the height of the proposed windmills that the safety buffer proposed between my home and the location of the windmill will not save my home, my life, or the life of my family members should one of the blades detach themselves from turbine. My life, the life of my family members and my home would be lost. Please note that my home is an original family farm house and was build in 1926. It also my understanding that the turbine will disrupt my ability to use the internet as the only internet I can get is satellite due to the remoteness of my home. I'm also under understanding that my cell phone will not work due to the sound frequency interference generated by the turbine. My cell phone and my husband's cell phone are the only means of communication we have to get help incase of an emergency. Putting my life and the life of my family members on the line in an emergency.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
36.2	10/15/2018	Anonymous Anonymous	My husband is a wildlife expert and has done extensive research in environmental impacts of a wind turbine due to the fact that the turbine would be around us once it is built. We have a low count of mosquitos and insects in the area due to our bat population living in the eves of our home and our barn. This has enabled us to have enjoyable nights out in our backyard, which we know will longer be the case once the turbine is turned on.	Thank you for your comment. An analysis of the foraging and economic implications of the bat fatalities associated with the federal action has been added into the EIS.
36.3	10/15/2018	Anonymous Anonymous	We have seen several bold eagle paris in the area and we know that with turbine they will be gone due to the sound wave interference created by the turbine once it is turned on. We have also seen several species of hawks as well as vultures who will disappear from area once the turbine is turned on.	Thank you for your comments.
36.4	10/15/2018	Anonymous Anonymous	As a homeowner and a taxpayer for Madison County, Iowa, My vote is a NO VOTE for this project. I do not want a turbine in my backyard due to the safety concerns that it will cause as well as the removal of the animal species that my husband and I enjoy watching. Thank you for considering my concerns when considering this application. Sincerely, Madison county, Iowa homeowner and taxpayer.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
37.1	10/15/2018	Anonymous Anonymous	I vote YES to Wind Turbines and the Arbor Hill Wind Project.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
38.1	10/15/2018	Steven Neal	I'm not a Wildlife Biologist. I live where a proposed wind farm would be built. It's also 6 miles from an operating wind farm. I've spent some time there to see what it's like. The ground is not littered with the carcasses of bats and birds. The "hum" of the turbine is easily covered by conversation. I was most concerned about the light at night. That light goes straight up and doesn't light up the ground. The current wind turbines in Iowa have already made it possible to close the nuclear powerplant at Palo, Ia. I vote yes for the wind farm.	Thank you for your comment.
39.1	10/15/2018	Judy Neal	I vote YES to the "Arbor Hill Wind Project". I am not sure where the information came in the flyer that was received with our weekly newspaper, but I don't believe there are hundreds of people living within the Arbor Hill Wind Project, because I live within that area. We are not densely populated, nor more so than the Macksburg Wind Project! They also state "Tons of Fossil Fuel is used to make wind generators". What they fail to mention is that it takes Tons of Fossil Fuels to make electricity and the enormous amount of water that is used. Wind Turbines use the least amount of water to generate electricity. They also fail to mention that due to Wind Energy that the Duane Arnold Energy Center in Palo, Iowas sole nuclear power plant, will shut down in late 2020. By shutting down one nuclear power plant because of Wind Turbines, how much nonrecyclable toxic waste is not being generated. Renewable Energy is going to have some growing pains as I am sure Electricity also had when it first came of age. Can you imagine what people said when they first built Hoover Dam, erected electrical poles and lines, not to imagine Interstates! What eyesores! Did these various items end life as we know it? Or should we all start building "Off The Grid". Each family raising its own food, making our own clothing, and have Wind Mills to help provide water to our homes? The Rock Age didn't end because of a Lack of Rocks.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
40.1	10/16/2018	L. R. Hommel	In regards to MidAmerican Energys request for a permit for incidental take of bats and eagles, please do not issue a permit and do not allow the applicants HCP to be implemented. The report says that they do not have means to prevent all death from existing wind turbine structures. They could have never built turbines or at least stop building turbines now. I find it hypocritical for MidAmerican to mitigate the bat and eagle habitat they disturbed by setting aside money for other habitat to be developed. I would like the bats and eagles to stay in my neighborhood and play their important roles in the ecosystem. The turbines are not a positive addition to the ecosystem or my neighborhood. Thank you.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
42.1	10/15/2018	Nancy Ferguson	To whom it may concern; I just read that today is the last day to submit a letter about my concern for the bats and the bald eagles possibly being affected by the MidAmerican project. I am Gravely concerned, are you kidding me? Many years ago, (I am a senior) l remember how tragic it was that the bald eagles were endangered and the things that humanity created that destroyed their habitat and even them. Like DDT and other chemicals. For years I was a professional photographer, and I work towards helping the comeback of the bald eagles. Seriously? Now you want endanger them again? What my input, please don't. I don't know what else to say because it's so pathetic that anyone would ask for permission to it anyway harm bald eagles or bats. Years of work, and money spent to try to bring them back, just to be threatened again? Find some other Alternatives, if you look for them you'll find them. Please just don't. Thank you sincerely Nancy Ferguson [address censored]	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
43.1	9/7/2018	Bertha Mathis	I see no mention of Golden Eagles which also migrate thru Iowa. We live in the Prairie Pothole migratory corridor and have seen Golden Eagles migrating with the Canada Geese both in the spring and fall migrations. There are numerous Bald Eagles nests through out this region, also.	The applicant has chosen not to include them in the HCP because golden eagle use in the project areas was found to be very low. The decision to pursue take coverage for golden eagles and other federally protected resources belongs to the applicant, and the USFWS cannot require inclusion of any species in a permit.

Comment #	Date	Author	Comment	Response to Comment
43.2	9/7/2018	Bertha Mathis	The bird studies that were done in Palo Alto County, Iowa were done after the migration period in early January and before the migration period in late March and April.	Thank you for your comment. This permit decision does not include any wind facilities in Palo Alto County.
43.3	9/7/2018	Bertha Mathis	I see no reason to issue a 30 year permit when the average life of a turbine is 12 years.	The HCP states that the operating life of a wind project is 20 to 30 years, and the applicant intends to repower turbines, as appropriate. Therefore, the requested permit duration is 30 years.
43.4	9/7/2018	Bertha Mathis	Please do not let MidAmerican Energy continue to degrade the Prairie Pothole migratory corridor with these Industrial Wind Electric Generating Plants. Here in Iowa the Iowa Utility Board has not regulated Wind Plants, so no environmental impact studies have been done except by their own industry. MidAmerican Energy's attorneys have said that the recommendations from the Iowa Department of Natural Resources are just recommendations and do not have to be followed. MidAmerican Energy is not trust worthy. Please do not issue a taking permit at this time.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
44.1	9/14/2018	Shellie Barclay	Please do not allow the incidental take of any endangered species, bats, or birds of prey. Our bat population has declined tremendously here in Michigan and Northern Indiana. We have been working hard to protect the Indiana bat species.	Thank you for your comment.
44.2	9/14/2018	Shellie Barclay	Bald and Golden eagles, Cranes, Herons, Hawks, and other birds of prey need to be protected from these huge industrial monstrosities. Iowa is known for it's Decorah Bald Eagles. We watch them on line every year. It is an exceptional program for educational purposes. This year the male bald eagle came up missing after the brood was hatched. There were two significant snow storms and he was seen no more. How sad and unbelievable. I can't be sure it was a wind turbine but it would be a possibility since he was never again seen and wind farms are known for hiding the evidence.	Thank you for your comment.
44.3	9/14/2018	Shellie Barclay	There are turbines now that do not have the spinning blades and if it is necessary to ruin the ecology with these useless pieces of crap, please consider mandating that any more construction be bird safe. There are also ways of detecting large birds in the area so the turbines can be shut off when detected. This should be soon mandated for the turbines now in existence to protect our bird species. Thank you, and please say NO to the Incidental Take Permit for MidAmerican Energy Company.	Thank you for your comment. We are adding an evaluation of eagle avoidance technologies in the EIS.

Comment #	Date	Author	Comment	Response to Comment
45.1	9/14/2018	Vicki Stanton	Any "take" of the American Bald Eagle, "incidental" or intentional, is, has been and shall be a Federal crime. No individual, business or project should be exempt from this law. All violators, without exception, should remain prosecutable to the highest extent of the law. Any act of exemption should be quashed with respect to our national pride.	Thank you for your comment.
45.2	9/14/2018	Vicki Stanton	Bald eagles mate for life, so no study can predict with any accuracy the impact "incidental takes" would have on the welfare of the species. I say NO!!	Thank you for your comment.
46.1	9/14/2018	Greg Cory	I oppose the killing of any endangered species for the sole purpose of making a profit. Studies show that mitigation efforts do absolutely zero in protecting the endangered bats, bees, and raptors. I ask that you chose option 1, No-action alternative: No permit would be issued, and no HCP would be implemented.	Thank you for your comment.
47.1	9/14/2018	Cynthia Berkland	I do not understand why any endangered or threatened species should have an "acceptable" death loss from a business. Nor is the death of an eagle or a bat "incidental" when that death can be reasonably anticipated by the very nature of the business. We know that eagles and bats are particularly menaced by wind turbines, and yet, for the sake of money, it's apparently okay to kill them. An individual who kills a bald eagle is subject to severe penalties, but a company is not? Why does a corporation have the "right" to kill eagles when individuals don't? Isn't the designation "endangered" meaningless if we make exceptions to it?	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
47.2	9/14/2018	Cynthia Berkland	The wind energy companies cannot accurately track the number of deaths their turbines will cause, so what happens if they surpass the "magic" number? Who will even know?	The methods for estimating take and accounting for searcher efficiency and carcass removal rate are provided in the HCP.
47.3	9/14/2018	Cynthia Berkland	Scavengers such as coyotes will come in and clean up carcasses before an inspector knows they are there. And are we supposed to believe that the company will turn off the turbines every day for those inspections to take place? Of course not; that would be too inefficient, time-consuming, and expensive.	The methods for estimating take and accounting for searcher efficiency and carcass removal rate are provided in the HCP.
47.4	9/14/2018	Cynthia Berkland	I remember when bald eagles were so rare that we feared we would lose them forever. Now, we have so many that we can afford to kill uncertain numbers of them for profit? It seems very clear that our priorities have shifted...in the wrong direction. Wind energy is not the solution it claims to be, and losing irreplaceable species in the pursuit of this false god is a genuine tragedy.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
48.1	9/14/2018	Stuart Perks	THIS YEAR I SAW HARDLY ANY BIRDS IN MY YARD, WE SAW 3 HUMMINGBIRDS 2 GOLD FINCHES AND THE THISTLE SOCKS ARE STILL FULL. NEVER IN MY LIFE HAVE I SEEN THIS SO THE ENVIROMENTAL IMPACT FROM WIND TURBINES IS CLEAR THEY ARE KILLING MILLIONS OF OUR BIRDS	Thank you for your comment.
48.2	9/14/2018	Stuart Perks	AND AFFECTING HUMANS WITH HEALTH PROBLEMS ..STOP THIS MADNES ...NOW !!!! PLEASE.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
48.3	9/14/2018	Stuart Perks	WARREN Buffet the billionaire who stated if he wasn't getting tax credits he wouldn't put up turbines because they are useless SO WHO WOULD HE CARE ABOUT KILLING EAGLES. NO TO ISSUING ANYMORE KILL PERMITS NO TO ANYMORE WIND TURBINES STOP ALL PTC NOW !!!!	Thank you for your comment.
49.1	9/14/2018	Sally Prather	We need the bats and birds! Bats are so beneficial to all of us and they are currently being threatened and many have died due to environmental issues. Please do not allow this application to proceed.	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
50.1	9/14/2018	Laurel Rohrer	Combined with white-nose syndrome, this project could contribute to significant declines in bat populations.	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria, which includes a determination of the project's impacts on the survival of the species in the wild. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
50.2	9/14/2018	Laurel Rohrer	Bats reproduce very slowly (usually one pup a year), so any loses can really impact the population. Studies have shown that both direct impacts from collisions and indirect impacts to bats from increased pressure from the turbine contribute to bat mortality, (see https://www1.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf).	Section 10 of the Endangered Species Act provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
50.3	9/14/2018	Laurel Rohrer	Similar data exists for bird mortality.	Thank you for your comment.
50.4	9/14/2018	Laurel Rohrer	The EIS discusses habitat, but bats can fly for miles in search of food, so even if there is no critical habitat near the turbines, bats may still be impacted.	Thank you for your comment.
51.1	9/24/2018	Anonymous Anonymous	When does this stop? When will we learn from the past? We cannot allow even the smallest members of our ecosystem to be affected by the wind turbines. What effect will this have in 50 years? 100? What downward spiral are we going to cause for our future, only to have to problem solve next?	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
51.2	9/24/2018	Anonymous Anonymous	We can handle these issues more wisely by not placing the turbines so closely to these wildlife rich areas.	Thank you for your comment. The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
51.3	9/24/2018	Anonymous Anonymous	Who has to deal with the consequences on a daily basis? Surely not MidAmerican. Advantage is being taken of our area and of the population all because a large company wants to? And what they say goes? Without any concern for the well-being of our future? Our natural resources need to be left alone and kept in prime condition- MidAmerican cannot be allowed to call the shots when it comes to the residents futures and the ecosystems wellbeing.	Thank you for your comment.
52.1	9/24/2018	Bret Terhaar	I live in Madison County, Iowa. The Bald Eagle is a proud and federally protected symbol of the United States of America. There has been a noticeable increase in the number of Bald Eagles in our area in the last ten years. There should be no allowance by the FWS to allow any Take of the symbol of American.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
52.2	9/24/2018	Bret Terhaar	We also live in an area populated by many of the bat species that are protected. The U.S. Geological Survey says the value of pest-control services to US agriculture provided by bats ranges from $3.7 billion to as much as $53 billion yearly.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
52.3	9/24/2018	Bret Terhaar	By 2030, the United States plans to produce 20% of its electricity from wind. Thats nearly six times as much as today, from three or four times as many turbines, striking more flying creatures due to their bigger size. I am asking that MidAmerican be denied an Incidental Take Permit for bat and bird species. This is a needless loss of wildlife.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
53.1	9/24/2018	Anonymous Anonymous	It is respectfully request that a permit for incidental taking of bats and bird species NOT be issued to MidAmerican Energy Company. Many including myself have enjoyed a slow return of eagles to north Iowa that were earlier destroyed by agricultural practices. Only recently have we been able to appreciate seeing nesting pairs in this area.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
53.2	9/24/2018	Anonymous Anonymous	Additionally, because of ice age activity we are bless with a pothole topography which makes northwest central Iowa a fly way for migrating geese of numerous species in the fall and spring. Because of the availabilty of feed and water many flock move through this area at a low altitude making them a target for the wind generator blades.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
54.1	9/24/2018	Shelley Smith	We are very concerned about what these massive industrial wind turbines coming to our area will do to our ecosystem. The bird population being affected by the spinning blades and Infrasound affects.	Thank you for your comment and concerns regarding the impacts of wind turbines on migratory birds. The USFWS is an agency with deeply grounded roots in the conservation of migratory birds over the last 100 years since the inception of the Migratory Bird Treaty Act. While under the current interpretation of the act, no permit is available for the incidental take of migratory birds, MidAmerican Energy Company (MEC) have worked with our biologists to establish their "Bird and Bat Conservation Strategy" that provides guidance to the company that reduces the impact of wind turbines on migratory birds. Though it is completely voluntary, MEC has committed to implementing this strategy which includes training of staff to identify birds during incidental monitoring, among other measures. Monitoring data collected at these sites will inform the need for additional measures that MEC may implement to protect and conserve migratory birds.

Comment #	Date	Author	Comment	Response to Comment
54.2	9/24/2018	Shelley Smith	It is proven that this pressure can kill bats. They are a big help in controlling the mosquito population, what happens when they are gone from this area? They carry so many diseases and illnesses and it seems like this would exacerbate this problem. Insecticides are not the answer, as if they poison insects what are they doing to us???	We have added a discussion of insect consumption by bats to Section 3.3.2 of the EIS.
54.3	9/24/2018	Shelley Smith	My family fishes and hunts and this whole issue that is facing NW Ohio will change all of this. I can't image hunting deer, dove, geese, ducks or fishing right next to a 600 ft. tall wind turbine...This will change our rural countryside for ever and it is heart breaking. I really appreciate your time in reading my concerns. Thank you. Here are a few interesting links: https://www.cbsnews.com/news/michigan-resident-infected-with-rare-deadly-mosquito-borne-virus/ http://nospray.org/naled-insecticide-fact-sheet/ https://www.cnn.com/2016/09/01/health/zika-spraying-honeybees/index.html	This federal action is limited to Iowa and does not include Ohio.
55.1	9/24/2018	Susan Goodman	Do not issue a permit for this killing of bats and birds. There is a serious possibility of extinction with so many massive industrial wind complexes killing them. Your job is to protect them.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
56.1	9/24/2018	Christy Rickers	I live within one of the existing windfarms. SPEED/AIR POLLUTION: Page 63 of the HCP states that the speed limit is 15 miles per hour. I have witnessed O&M staff drive much faster than that on several occasions, on access roads AND on the regular roads.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
56.2	9/24/2018	Christy Rickers	Also, a part of the EIS discusses increased pollution from O&M traffic being countered by the clean energy of the turbines. I would like to note that the power generated is sent far away on the grid, yet the pollution increased HERE at the windfarm location. There is considerable pollution produced during construction and repowering. AND as row crop farmers, we increase pollution when we use our farm equipment to try to restore the crop land impacted by construction equipment (increased use of decompaction equipment and increase in fertilizer use).	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa. Therefore, the CO2 associated with the construction of the turbines is outside of the scope of this EIS.
56.3	9/24/2018	Christy Rickers	EROSION: We still have erosion issues along access roads.	Thank you for your comment.
56.4	9/24/2018	Christy Rickers	GARBAGE: During construction and repowering, there is a lot of garbage (mostly food and drink containers) left behind. Also, in addition to the usual/local garbage left along the roadsides, there has been a noticeable increase in garbage left by O&M personnel.	Thank you for your comment.
56.5	9/24/2018	Christy Rickers	EAGLES: There has been an increase in eagle sightings in my area over the last 5-10 years. I had never noticed any within my land until the last couple of years. This spring I saw eagles within 1000 feet of the windtowers on my land, usually eating carrion. I am over 4 miles from a river or any other body of water. Thank you for the opportunity to comment	Thank you for your comment.
56.6	9/24/2018	Christy Rickers	CARCASSES: There is some discussion of scavengers in the HCP and how it will be measured. However, I think scavenging occurs far more often and more quickly than can be measured by the proposed trial experiments. I suspect that much of the bird and bat fatalities disappear before they can be recorded. Plus it is impossible for all of the carcasses to be seen within a cropped field, under snow fall, after rain wash, or after scavenged/drug around.	The methods for estimating take and accounting for searcher efficiency and carcass removal rate are provided in the HCP. The Service does not know of any other available methods that are proven to increase the accuracy of fatality estimates.
56.7	9/24/2018	Christy Rickers	MONITORING: I take issue with a company doing its own self monitoring. That is just bad policy no matter how much training of O&M personnel.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
57.1	9/24/2018	Jeanne Ponto	No way should the wind industry be given permission to kill the bald eagle or any other animal that is beneficial to farming. Any person killing these magnificent creatures should be prosecuted to the full extent of the law! The wind industry has been given far too much money and eased regulation to further their takeover of prime farmland. What they promise to do is not what they actually do. These monstrosities are harmful to humans as well as the bald eagles they will kill. Please DO NOT allow this!	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
58.1	9/24/2018	Terry McGovern	I am strongly opposed to any incidental take permits issued toward MidAmerican Energy to kill protected bats and our national symbol, the American Eagle. As a veteran, the Eagle has special meaning to me. Seeing it needlessly slaughtered so Berkshire Hathaway can grow a fatter account is shameful.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.

Comment #	Date	Author	Comment	Response to Comment
58.2	9/24/2018	Terry McGovern	The wind turbines should never be allowed to be placed in areas where bats or eagles are present. It takes a nesting pair of eagles 25 years to produce a single off spring that will make it to adulthood.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
58.3	9/24/2018	Terry McGovern	Bats usually produce only one pup that survives its first year--the killing of its mother by turbines will result in localized extinctions of bats. Which means farmers will need to use a lot more insecticides as the bats provide tremendous insect control where they are present.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.
58.4	9/24/2018	Terry McGovern	DO NOT approve MidAmerican's request--hold them accountable for negligently building wind turbines where endangered bats and eagles were already present. Those species have just as much a right to live as humans. Fine this company to the full extent of the law for each bat and eagle they kill. See what their executives are making--tens of millions of dollars per year--they can afford to pay the fines, so fine the hell out of them.	Thank you for your comment.
59.1	9/24/2018	Gregg Hubner	Please do not let Mid American Energy get a permit to kill bats and birds with wind turbines. When we lose bats we gain insects. That costs farmers millions in extra chemicals, which hurt our environment also. It costs millions of dollars in reduced yields because of increased amounts of insects.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.
59.2	9/24/2018	Gregg Hubner	And birds? People in the rural areas appreciate their rural living and a big part of that is songbirds. Then there are the migrating birds, some of which are becoming extinct.	Thank you for your comment. An analysis of impacts to birds is provided in chapter 4 of the EIS.
59.3	9/24/2018	Gregg Hubner	I think Warren Buffet has enough money. He is destroying rural living for tax credits, and it's a shame.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
60.1	9/24/2018	Ted Ellis	Please dont allow any more wind towers period. The harm to wildlife is too harmful! The migration and and bird counts done by Envenergy (Mid-American) were done in a non migration time and very near the reserve area of Five Island Lake. Stationary radio towers kill enough birds.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
61.1	9/24/2018	Joaine Finck	In recent years, we have experienced the bald eagles returning to rural areas of Iowa during the winter months. The sight of them is very uplifting, as they were so close to extinction not long ago. We must do what we can to protect them. There are many, many large road kill during the winter months in Iowa when the turkey buzzards are not around. The eagles clean up many of the road kill deer. The road kill are not the farmers' responsibility to pick up...the state and county road crews currently do not have the budgets to pick them up and dispose of them properly, so they remain in the road right-of-way, or in the fields where they die. When the Industrial Wind Turbines move in, it endangers the eagles, and when they are attracted from miles away by the smell of a dead animal, this puts them at high risk. I understand Mid-American is basically asking permission for incidental killing of these national treasures. This should not be allowed.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
61.2	9/24/2018	Joaine Finck	Also, bats provide a great service to our ecology. According to Amazing Bat Facts http://www.batrescue.org/batfacts/batfacts.html the Little Brown Bat "can eat up to 1000 mosquitoes in a single hour, and is one of the world's longest-lived mammals for its size, with life spans of almost 40 years." But this is only if they live. Also, according to Scientific American, "The flying animals run into spinning blades, or the rapid decrease in air pressure around the turbines can cause bleeding in their lungs." https://www.scientificamerican.com/article/bat-killings-by-wind-energy-turbines-continue/. Bats normally only produce one baby per year. "Most bat moms give birth to only a single pup each year, making them very vulnerable to extinction. Bats are the slowest reproducing mammals on earth for their size." http://www.batrescue.org/batfacts/batfacts.html. Many think chemicals/pesticides are the best way to conrol mosquitoes, which carry Zika and West Nile Virus, among other diseases. Just what we need...more chemicals being applied to do what God gave us bats for. In summary, I believe giving permission to Mid-American to kill bald eagles and bats is a very bad idea. We need them for our ecological balance.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
62.1	9/25/2018	Anonymous Anonymous	I think I lost my other comments , so will repeat. Please read the article "Economic Importance of Bats in Agriculture". It is written by Justin Boyles, Paul Cryan, Gary McCracken, and Thomas Kunz. After reading this I ask that you please deny the application for and incidental take permit for midwestern bat and bird species, that is requested by MidAmerican Energy Company	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.
63.2	9/27/2018	Elaine Schultz	I am very concerned about the impact that the proposed huge turbines will have on our bird and bat population. If I understand correctly, in my area0, there is a bird migrating path. A turbine (or many) would disturb this path. It will also greatly effect the bats. It is my understanding that they don't even have to come in contact with a turbine. Their delicate make up is compromised by the air pressure near the turbine. If our bats are killed, what will happen to our mosquito population? The disease carried by the mosquitoes can be deadly to those bitten by them. This is only part of my concern with the turbines. I wanted to express the bird and bat issues with this department. Please look into this issue. Thank you.	Thank you for your comment. We have incorporated an evaluation of bat insect consumption into the EIS.
64.1	10/1/2018	Aron Flickinger	There are plenty of locations outside the area protected by the Endangered Species Act to place wind turbines. It seems like this request should have been placed before the construction of wind turbines in these sensitive areas, if Mid-American Energy really cared about the environment and the wildlife that live within. What is the purpose of having the Federal Endangered Species Act, if it is not going to protect those species listed? One company should not be able to dictate to the people of Iowa where it is important to protect the enviroment and the wildlife that live within. There are millions of acres in the U.S. that are more remote and suitable for wind turbines that would not harm endangered species.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
64.2	10/1/2018	Aron Flickinger	It is shameful to think that Mid-American Energy can ask for an allowable number of deaths to occur over a 30 year period of time. How can anyone be certain that the deaths these wind turbines will cause will not result in the elimination of any of the species listed within the turbine areas? Is the location of my farm and the habitat it provides less important? I only support the no-action alternative.	Thank you for your comment.
65.1	10/1/2018	Marshall Harpole	Conservationist have spent decades to identify, locate, and protect our natural, necessary, and beautiful wild life and offered with the help of national, state, and local government to protect those that are endangered, or face the threat of extinction. Now for a private corporation to ask for permission to override and disobey the work of the many who have worked so hard to preserve is totally wrong. By requesting this action they admit they realized the devastation they are creating with their project and are trying to undermine the all that has been gained by the endangered species act.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
65.2	10/1/2018	Marshall Harpole	This not only will impact the endangered species but also all scavengers such as vultures, crows, hawks, owls, etc that are not on endangered list but will be impacted likewise. This in turn will propagate the concentration of scavengers such as coyotes, raccoons, opossum, wild pigs, and etc. looking for easy meals around the turbine area which located in close proximity of homes. Therefore I wish for this request to be denied!	Thank you for your comment.
66.1	10/1/2018	Joni Butts	I am sending you this request to STOP THE BAT AND BALD EAGLE TAKE IN IOWA! I am not sure why MidAmerican feels they have the right to kill much needed bats along with bald eagles. No one has the right to put these species in peril whether it is incidental or not! We don't need West Nile becoming a plague!! God only knows what other nasty deceases we would be subject to due to the death of bats!	Thank you for your comment.
66.2	10/1/2018	Joni Butts	Also the Bald Eagle represents FREEDOM in the USA we can not allow Mid American Energy to decide what FREEDOM means! Please do not allow this "take" for the good of our country and our well being	Thank you for your comment.
67.1	10/1/2018	Janna Swanson	MidAmerican is applying for their first permit in 20 years of running wind turbines. This is likely because they have been skirting regulation by avoiding receiving the proper approval of the Iowa Utilities Board. Who can kill our endangered species for years and then apply for a permit once they are under the spotlight and get away with it? Will they be held accountable and fined for the bats and birds that they have taken to date? MidAmerican says that they will be improving habitat across the state while their wind turbine installations across the state take up roughly the same amount of land as 8 times the land mass of Des Moines. How would that even be accomplished? I dare say that MidAmerican is only giving lip service to this problem because they know that no one is in the position to hold them accountable. We have heard that they are telling landowners in Adair County that they cannot have wind turbines because of bat habitat on their land. Some landowners are responding by pushing in their trees to remove the bat habitat. While MidAmerican will claim that they have no power over that situation I would think that the situation would be apparent to them.	Thank you for your comment.
67.2	10/1/2018	Janna Swanson	With the taking of bats especially MidAmerican also undermines out base economy of agriculture. Birds and bats eat the pests that eat and damage our crops. Birds and bats cut our usage of pesticides which is a win for everyone. The USGS has even done a comprehensive study on the economic impacts of bats that I will attach.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
67.3	10/1/2018	Janna Swanson	MidAmerican is also seeking to build at least 176 wind turbines around a number of lakes and wildlife areas in Palo Alto Iowa. These areas are to the NE of Five Island Lake near Emmetsburg and they are in negotiations to buy a project that would impact Lost Island Lake in the same general area. How could anyone, even MidAmerican, mitigate the devastating impacts of 519,937 acres of industrial land use across the state? Many people may point to climate change as being a larger risk to our birds and bats.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
67.4	10/1/2018	Janna Swanson	It is difficult to find information on what amount of CO2 industrial wind turbines are avoiding but the American Wind Energy Association has boasted that they only cut less than 1% of the 35-40 billion tons of CO2 emitted by the energy and concrete sectors globally each year. Even doubling the amount of turbines we had in 2016 would not take us past that 1% according to AWEA's numbers. This trivial amount is not worth the destruction industrial wind expects to be excused of.	Thank you for your comment.
68.1	10/1/2018	Lori Kinyon	I would like to request that you do not approve any application by MidAmerican to allow incidental take of endangered bat and bird species in the state of Iowa. My family lives in the area where the proposed windmills will be erected (Adair County, state of Iowa), and we hope the FWS will continue to protect the wildlife living in our area that will be harmed with the erection of the proposed monstrous windmills. We have a duty to protect our endangered and protected species. Our county has many bald eagles who migrate and spend their winters, as well as a group who choose to stay over the summer and raise their families. Any loss of these protected beautiful birds would be very unfortunate! cannot personally speak to the number of bats in our area since they are nocturnal, but I hope your agency researches thoroughly the impact these windmills will have on them as well. Thank you for allowing us the opportunity to comment on this issue.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.

Comment #	Date	Author	Comment	Response to Comment
69.1	10/2/2018	Harold Youngblut	I would like to voice my opposition to the "taking" permit requested by Mid American Energy. As reported by the Des Moines Register on 1-24-2018 More than 40 eagle have been killed in Iowa during the last 3 years, and lawmakers say a $50 civil penalty isn't enough to prevent it. ""This is a way of saying we value our eagles in Iowa " said Representative Terry Baxter. Sponsor of a new bill to increase the penalty. "We do value them, and it puts some teeth to this", and it might save some eagles. "I'm hoping that this $2500 would deter people from doing any more harm," said Rep Phyllis Thede, D-Bettendorf. From the same article , Jeff Swearngin, the bureau chief for the Iowa Department of Natural Resources Law Enforcement Bureau, called the numbers. "ALARMING" and said they don't even include the birds who die from flying into things such as power lines. My thoughts are, if Mr Swearngin had been totally honest he would also admitted he had not included wind turbine kills in that statement. Federal Law has civil penalties up to $5000.00 or one year of imprisonment. Think about this, if I open a taxidermy business that killed eagles, or lets say I just took dead ones that others killed, and then I sold them so that I could make a living. Would the State of Iowa or the United States of America allow me to do this. No the federal law prohibits the "take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead..." Please explain to very American, that gets that chill of respect run down their spine as they catch a view of a majestic bald eagle as it soars overhead, how you could possibly allow a company KILL our national image of freedom and victories hard fought. FOR what. GREED.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
69.2	10/2/2018	Harold Youngblut	I am a farmer in Black Hawk county Iowa. The industrial wind turbines also kill bats and many other birds. Reading from a April 2011 sciencemag.org article. " We present here analyses suggesting that loss of bats in North America could lead to agricultural losses estimated at more than $3.7 BILLION /YEAR". Billions of dollars a year that Iowa farmers like myself will suffer financially in part of those losses. The same article goes on to say, "We suggest that a wait-and-see approach to the issue of widespread decline of bat populations is not an option because the life histories of these flying, nocturnal mammals-characterized by long generation times and low reproductive rates- mean that population recovery is unlikely for decades or even centuries , if at all". How can you allow unlimited kills to Mid American Energy when....., sciences says it is going to costs FARMERS so much, ..when an elementary student sees a dead bald eagle on the internet, with the headline "killed by wind turbines" how do you tell these kids you allowed this to happen.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
69.3	10/2/2018	Harold Youngblut	At the VERY LEAST they should have to pay just like every other poacher. $5000 per bird minimum, with regular local DNR inspections that Mid American should be charged for. Yes, each quarterly, unscheduled inspection should be paid for by Mid American Energy as part of any permit that is issued. Without, non permit holder employees doing the unscheduled inspections, no permit should be issued. They should NOT be given a pass on this. Please reject their request.	Thank you for your comment.
70.1	10/2/2018	Cynthia Neubauer	I am strongly opposed to allowing Mid American Energy Company, Iowa to be awarded a Incidental Take Permit for Midwestern Bat and Bird Species. My family heritage is farming. My grandparents and parents were stewards of the land. They took pride in maintaining safe barriers from waterways and creating habitat for all animals. My father (retired Army) was concerned about wind turbines from the start. He recognized the damage they could do not only to the beautiful Iowa landscape but also to the wildlife, especially eagles. Mid American Energy does not have the right to bring harm to any wildlife anywhere or to indiscriminately pollute our farmland with visual structures not consistent with agriculture.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
70.2	10/2/2018	Cynthia Neubauer	I admit, bats are portrayed poorly in entertainment and books, however; their importance in our ecosystem is matched by few other creatures.	Thank you for your comment. We have incorporated an evaluation of bat insect consumption into the EIS.
70.3	10/2/2018	Cynthia Neubauer	Migrating birds such as snow geese and American pelicans are at risk as well. Even nesting owls would potentially be driven from our countryside by the sound emitted by huge, ugly and unnecessary wind turbines.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
70.4	10/2/2018	Cynthia Neubauer	The most important statement I can make is about Eagles. The American Bald Eagle was once considered endangered and I would absolutely HATE to have this happen again. The symbol of our country deserves protection. It is with pride that I ask you, our United States Fish and Wildlife Service officials, to maintain that symbol's protection by disallowing the application presented to your bureau. Do the right thing. Say no.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
71.1	10/9/2018	Gene Onken	In the Application for Incidental Take Permit document issued by the Fish and Wildlife Service (FWS) under the "Applicant's Project" section it was stated: 1. "Bald eagle-specific avoidance and minimization measures will include carrion removal in the vicinity of projects and livestock operator outreach. Reduction in scavenging opportunities are expected to reduce eagle use near wind projects". COMMENT: Law enforcement reports published in local newspapers report a very high rate of road kill of white tail deer by collision with motor vehicles. These incidents are reported weekly within the proposed project area. There is no feasible and practical way to reduce or eliminate these scavenging opportunities. This proposed mitigation to curbing bald eagle mortality is thus not effectual.	Thank you for your comment.
71.2	10/9/2018	Gene Onken	2. "Minimization measures (Bat specific) will include blade feathering below manufacturer's cut-in speed at all projects from March 15 through November 15 from sunset to sunrise." COMMENT: No credible research data is provided indicating just how effective the stated mitigation's for reducing bat mortality will be. There is no guarantee or statistical probability prediction with confidence intervals (Beta error) that these proposed mitigation's will keep bat mortality levels within any acceptable level. What would the mortality level be with these mitigation's implemented, and what would the mortality level be without mitigation? The measures offered are non-conclusive and therefore not adequate. They are lacking in scientific data derived from statistically analyzed research.	Thank you for your comment. The EIS uses the best available science to analyze bat fatality under the alternatives. Provisions for implementing adaptive management, should the expected outcome be exceeded are also identified in the HCP.

Comment #	Date	Author	Comment	Response to Comment
71.3	10/9/2018	Gene Onken	3. "MidAmerica has committed to fully offsetting the impacts of the taking for all covered bat species through habitat restoration, preservation, and enhancement, as well as restoration and preservation of at-risk occupied artificial structures." COMMENT: (a) Indeed, can we really believe that MidAmerica has the capability and intent to restore and preserve every old or decadent barn, chicken house, abandoned hog facility, cattle or sheep shed, machine shed, unoccupied home and outdoor toilet that may provide bat roosting throughout 22 Iowa Counties? And does the USDI Fish and Wildlife Service really have the intent and capability to monitor and enforce this provision? Although FWS indicates on their web site addressing wind farm development that their tier procedure is voluntary, project mitigation measures documented in an Environmental Impact Statement (EIS) under the National Environmental Policy Act of 1969 are NOT voluntary. They are mandatory and legally binding. To surmise otherwise is invitation for a legal complaint.	Thank you for your comment.
71.4	10/9/2018	Gene Onken	(b) Although occupied artificial structures are addressed, no provision or mitigation is provided for restoration of at-risk occupied NATURAL roosting sites or bat habitats. These NATURAL sites include farm windbreaks, timber and forested areas, tree lined riparian zones and other stands of trees offering natural habitats and connectivity for named endangered and at risk species. With these important habitats excluded and at risk of destruction, it is more than apparent the proposed action by MidAmerican Energy Company, Iowa is not in compliance with the Endangered Species Act and the National Environmental Policy Act of 1969.	Thank you for your comment. The habitat preservation and restoration components of the HCP addresses natural habitat.
71.5	10/9/2018	Gene Onken	The subject environmental analysis is deficient, incomplete and unsubstantiated with scientific study and lack of data. The local environments will be seriously impacted and damaged by the proposed action. There is a huge quantity of case law to substantiate the inadequacy of this DEIS, it's quality of documentation and it's proposed mitigation. MY POSITION: As an affected party and a landowner in T75N, R31W, NW1/4 S35, I accept only the No Action Alternative.	Thank you for your comment.
72.1	10/15/2018	D. Barnett	I request you deny MidAmerican Energy Companys application. Iowa has a lot of natural landscape and countryside where wildlife have resided for centuries. It is important to maintain a balance of wildlife - especially the bats which consume huge numbers of mosquitoes. As you know, mosquitoes can transmit WestNile virus. Protecting bats so they can control mosquito populations is financially economical and avoids the use of chemicals which can infiltrate our water systems. Please take everyones health into consideration.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
73.1	10/15/2018	Kandi Beaman	This comment is a NO VOTE for this development project. My husband and I moved out to the country to enjoy what the country has to offer. From starry nights without light pollution to the wild animals that live on our land. I am a home owner and Madison county tax payer who lives within the area for this development project and have attended all of the meeting associated with this project. I am outraged that MidAmerican Energy has applied for a permit to kill our majestic national bird our symbol of freedom which is protected by law. I am, perhaps, even more outraged they have applied for the inclusion of bat kills. There are endangered bats throughout our state, and specifically in the Arbor Hill region where MAE has applied for the right to destroy our beautiful, residential countryside. According to Save the Eagles International, and contrary to what we are told, wind farms will cause the extinction of many bird and bat species. The harm to our environment by wind turbines is at best a tremendous alarm, or at least it should be, and likely a true environmental disaster in the making. In fact SEI estimates the actual kills of birds, particularly raptors, and bats is several million every year.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
73.2	10/15/2018	Kandi Beaman	Wildlife expert Jim Wiegand has documented how areas searched under wind turbines are still confined to a 200 foot radius, even though modern turbines catapult 80% of bird and bat carcasses much further. Windfarm owners, operating under voluntary (!) USFWS guidelines, commission studies that search much too small areas, look only once every 30-90 days, ensuring that scavengers remove most carcasses. These research protocols are designed to guarantee extremely low mortality statistics, hiding the true death tolls and the USFWS seems inclined to let the deception continue.	Thank you for your comment. The methods for estimating take and accounting for searcher efficiency and carcass removal rate are provided in the HCP.

Comment #	Date	Author	Comment	Response to Comment
73.3	10/15/2018	Kandi Beaman	In addition, bird mortality data are now considered to be the property of windfarm owners, which means the public no longer has a right to know. This is a dangerous precedent! What will it take for us to stop embracing industrial, capitalist carnage in our country? The rapid decimation of bats due to wind turbines is astonishing and purely terrifying. Professionals that are working hard to make known the truth about the kills have estimated as high as 30-50 million bats are killed annually. This is frankly unsustainable. The ecological value of bats to our agricultural areas is hard to measure. Each species plays a fundamental role in its local ecosystem. An estimated 528 different plant species rely on bat pollination and seed dispersal for sustainability. And bats control pest populations. One estimate of the agricultural benefits is 22.9 billion dollars annually in the U.S. alone. The added metric tons of pesticides required to make up for an absent bat population will be devastating. Pesticides are dangerous neurotoxins that drift for several miles. It will put the health of all living in their path at greater risk for a plethora of known health issues. In addition, ground wildlife will be decimated by these poisons. Bats are often considered keystone species that are essential to ecosystems. While scientists and the wind industry have known for more than a decade that wind turbines kill bats, we are only recently finding out how bat fatalities may directly cause dire impacts on whole populations of bat species. -Bat Conservation International. We need to implement significant conservation measures to reduce mortality from wind turbine collisions which will protect all bats, not allow large privately owned companies to kill them with impunity. Clive Hambler is a lecturer in biological and human sciences at Oxford University and he has recently warned us: Wind turbines only last for half as long as previously thought... But in their short lifespans, turbines can do a lot of damage. Wind farms are devastating populations of rare birds and bats across the world, driving some to the point of extinction. Most environmentalists just don't want to know. Because they're so desperate to believe in renewable energy, they're in a state of denial.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into Section 3.3.2 of the EIS.

Comment #	Date	Author	Comment	Response to Comment
73.6	10/15/2018	Kandi Beaman	Mr. Hambler has worked as an environmental consultant and now teaches ecology and conservation. He further warns us: Loss of habitat is the single biggest cause of species extinction. Wind farms not only reduce habitat size but create population sinks zones which attract animals and then kill them. "Why is the public not more aware of this carnage? Because the wind industry (with the shameful complicity of some ornithological organizations) has gone to great trouble to cover it up. [And] because the ongoing obsession with climate change means that many environmentalists are turning a blind eye to the ecological costs of renewable energy." What wind companies clearly don't appreciate for they know next to nothing about biology climate change wont drive birds (including our bald eagles) and bats species to extinction; well-meaning environmentalists might. And they might, by being complicit in wind energy's construction of industrial turbines. Please, I urgently submit this comment in opposition of MidAmerican Energy's request to kill our majestic eagles and our vital bat populations. For the safety of the people, and the sake of our planet, do not allow MidAmerican Energy the "right" to do what none of us can or should do to our fragile ecosystem - decimate it.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria, which includes a determination of whether or not the proposed action will jeopardize the survival of the covered species in the wild. The Service's evaluation of these criteria will be included in the Findings Document associated with the permit decision.
74.1	10/15/2018	David Voigts	I did not learn of this DEIS and DHCP in time to review it in detail. Although I generally support the permit and wind power, I found some troubling aspects to this project and application. There seems to be no protection for other birds except Bald Eagles or bats beyond the target species. I encourage the take permit and the monitoring program to be expanded to include all migratory birds and all bats.	Thank you for your comment. MidAmerican has included monitoring of all birds and bats in their monitoring protocols. Under the current interpretation of the Migratory Bird Treaty Act (solicitor opinion M-37050), incidental taking of migratory birds is not prohibited, and the Service cannot require their inclusion in a permit. However, the applicant has provided for voluntary conservation measures for migratory birds in their Bird and Bat Conservation Strategy, developed under the Service's Land-Based Wind Energy Guidelines. This is a voluntary action on the part of the applicant and is included as an Appendix to the EIS.

Comment #	Date	Author	Comment	Response to Comment
74.2	10/15/2018	David Voigts	A 30-year permit seem excessive, especially since there will probably be many changes to our environment during the next 30 years as our world warms.	Thank you for your comment. The HCP includes adaptive management and changed circumstances measures to accommodate for change during the proposed permit term.
74.3	10/15/2018	David Voigts	Also, there does not seem to be any provision in the take permit for new technologies or management practices to reduce take during the permit life. There needs to be a provision to include this. I would like to be informed of developments as this permitting process moves forward. This concludes my comments	Thank you for your comment. We have incorporated a discussion of new bird and bat avoidance/deterrent technologies in the EIS. The HCP provides for the use of new technologies in the adaptive management section.
75.1	10/15/2018	Edison Electric Institute	The proposed conservation approach contemplated under the draft HCP is creative and likely will lead to improved streamlining of the permitting process for MEC while still meeting the legal criteria and conservation purposes of both ESA and BGEPA. EEI supports the issuance of the ITP due to the significant benefits of MEC's programmatic approach to preparing the HCP for the company's Iowa wind energy portfolio. The HCP covers 22 wind facilities and provides a framework to address future wind development in Iowa on a breadth and scale that is unprecedented for the wind industry and electric power sector more broadly. Covering a number of ESA-listed species, non-listed species and federally protected eagles, the HCP includes comprehensive solutions for estimating and monitoring any take of eagles; describes take avoidance and minimization measures; provides compensatory mitigation funding; supports activities that will fully offset the impact of any potential taking of Covered Species; and requires periodic compliance monitoring and reporting activities.	Thank you for your comments.
75.2	10/15/2018	Edison Electric Institute	There are multiple benefits of evaluating and addressing potential impacts holistically, through a programmatic approach, rather than on a project-by-project basis. Processing one ITP application reduces the administrative burden on the Service staff in needing to evaluate, process, and administer separate ESA take applications for each of MEC's operating wind facilities throughout Iowa. Preparing and submitting one ITP application allows MEC to focus its resources on the conservation needs associated with the development and operation of its facilities. The review of any future wind projects can be tiered off the approved programmatic HCP. A programmatic approach also increases regulatory consistency for the company while reducing the time and cost of preparing and pursuing numerous applications for all its wind assets.	Thank you for your comments.

Comment #	Date	Author	Comment	Response to Comment
75.3	10/15/2018	Edison Electric Institute	MEC's programmatic approach has relied on a cooperative conservation effort among the company, the Service, and the Iowa Department of Natural Resources to design a study of wind operation impacts, and to collect post-construction monitoring (PCM) data that informed decision-making in preparing the HCP. MEC's PCM dataset was developed using consistent search efforts and protocols on an annual basis within each wind facility and across the studied fleet. MEC used fleet-specific and Covered Species-specific information to tailor a conservation strategy that is responsive to the impacts identified in, and estimated from, the monitoring data. By basing each successive study on prior study results and conclusions, the monitoring data demonstrates a step-wise approach to decision making. MEC designed the 2016 monitoring studies based, in part, on the results of the 2015 monitoring studies, as well as questions raised from the 2015 monitoring data.	Thank you for your comments.
75.4	10/15/2018	Edison Electric Institute	MEC's bald eagle collision risk model uses PCM data to inform collision risk updates. Using both post-construction eagle activity and mortality information, MEC can better estimate and mitigate for impacts at existing wind energy facilities. By drawing on local eagle use information most relevant to informing risk over the permit term, overall risk at MEC's facilities is characterized more appropriately. This updated risk profile is supported by the eagle use results from reference areas—areas similar to the company's wind facilities but without wind turbines—which indicate that eagle use in reference areas is 70 percent greater than eagle use within wind energy facilities.	Thank you for your comments.
75.5	10/15/2018	Edison Electric Institute	MEC's HCP is comprehensively tailored to address the impacts identified from the PCM data. Based on 2015 and 2016 monitoring results, MEC identified certain wind facilities where curtailment was most appropriate, while still allowing the company to maximize wind energy generation at facilities with minimal risk to bats. The result is a conservation strategy that appropriately minimizes impacts in balance with generating wind energy to meet MEC's renewable energy goals. EEI believes the proposed approach outlined in MEC's HCP and the issuance of one permit covering multiple wind energy facilities in a similar geographic setting will provide greater efficiency to both the company and the Service and will lead to improved conservation benefits to the Covered Species.	Thank you for your comments.
75.6	10/15/2018	Edison Electric Institute	Given the scale and approach of the HCP, EEI believes the proposal potentially is precedent-setting, both for the wind industry and electric power sector more broadly, and, as a result, we are encouraged by and supportive of the approach. However, while we appreciate the creativity and flexibility in considering alternate approaches under ESA and BGEPA as part of this HCP, and while some project proponents might choose to cover both ESA-listed species and eagles in one permit or to include multiple facilities in one HCP, the decision to do so remains at the discretion of the applicant.	Thank you for your comments.

Comment #	Date	Author	Comment	Response to Comment
75.7	10/15/2018	Edison Electric Institute	It would be appropriate for the Service, based on MEC's programmatic HCP, to finalize the Environmental Impact Statement selecting the HCP alternative as the preferred alternative and to issue the incidental take coverage associated with MEC's operation of its Iowa wind energy facilities over a 30-year period. The MEC HCP ensures that any take of bats and bald eagles will be compatible with the preservation of the species.	Thank you for your comments.
76.1	10/16/2018	Duke Energy	The programmatic, systemwide approach proposed in the Draft HCP offers significant benefits compared to a project-by-project approach. Most importantly, the systemwide approach provides greater conservation benefits to the covered species by increasing the scale at which more meaningful conservation outcomes can be achieved as opposed to piecemeal conservation from an individual project approach. Furthermore, this approach significantly reduces the burdens on the Service and applicant by utilizing one application, one National Environmental Protection Act (NEPA) analysis, and one HCP for multiple projects with similar characteristics, as opposed to 22 distinct ESA applications and NEPA analyses and potentially 22 separate permits under the BGEPA. The proposed approach presented under the Draft HCP is innovative and will lead to improved efficiency of the permitting process while still meeting the legal criteria and improving the conservation benefits intended by both the ESA and BGEPA. With respect to how bald eagles are addressed under the Draft HCP, the statewide programmatic approach covering 22 different wind projects is appropriate and very encouraging. Recognizing and analyzing the lower risk to resident breeding eagles and higher risk to wintering and migratory eagles is more scientifically sound, and assigning the estimated 10 bald eagle takes per year across the 22 facilities instead of on a project-specific level is appropriate. Duke Energy believes this approach is much more efficient, and elements of this approach, such as assigning estimated takes across multiple facilities within a region/flyway and estimating risk based on the migratory population as opposed to the local area population, should be used as a model for a general permit program for eagles.	Thank you for your comment.
77.1	10/15/2018	Energy and Wildlife Action Coalition (EWAC)	EWAC believes the proposed action will provide a threefold benefit of: 1) providing high conservation value to the covered species by evaluating and addressing potential impacts holistically, rather than on a project-by-project basis; 2) reducing the administrative burden on the USFWS staff in needing to evaluate, process, and administer twenty-two distinct ESA applications (and potentially as many permits under BGEPA if the applicant chose to pursue them for each facility) for each of its operating wind facilities throughout Iowa; and 3) increasing predictability for the Applicant, while reducing the time and cost that would be associated with preparing and pursuing numerous applications for each asset individually. EWAC commends the creative approaches to estimating take, monitoring, and providing mitigation, and believes innovation is key to a fully functional permitting program. We applaud the outside-the-box thinking on the part of the Applicant and USFWS in their consideration of a different approach to addressing these permitting elements.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
77.2	10/15/2018	Energy and Wildlife Action Coalition (EWAC)	As noted above, EWAC believes the proposed approach outlined in the Applicant's HCP, and the issuance of one permit covering multiple wind energy facilities in a similar geographic setting would provide greater efficiency to both the Applicant and USFWS and improved conservation benefits to the covered species. However, while we appreciate the creativity and flexibility in considering alternate approaches under ESA and BGEPA as part of this HCP, it is important to note that these programs remain voluntary and applicant-driven, and while some project proponents might choose, like the Applicant, to cover both ESA-listed species and eagles under one permit, or include multiple facilities in one HCP, the decision to do so remains at the discretion of the applicant and should remain that way.	Thank you for your comment.
77.3	10/15/2018	Energy and Wildlife Action Coalition (EWAC)	With respect to how the HCP addresses bald eagles, EWAC commends the USFWS's consideration of a programmatic state-wide approach covering twenty-two different wind projects and authorizing a state-wide, rather than project-specific, take predication. EWAC is encouraged by the recognition and analysis of the differences in risk between resident breeding eagles and wintering and migratory eagles. EWAC believes this approach is scientifically sound, more efficient, and should be considered as a model for a general permit program for eagles. Given the scale and approach of the HCP (i.e. covering the Applicant's windfarms throughout Iowa and including a number of ESA-listed species as well as eagles), EWAC believes the proposal is fairly unique and potentially precedent-setting, both for the wind industry and electric power sector more broadly. EWAC appreciates the opportunity to comment on this proposal, and looks forward to continuing to work with the USFWS and other stakeholders in the hopes of finding ways to further improve upon the ESA section 10 and BGEPA permitting processes.	Thank you for your comment.
78.1	9/24/2018	Thomas and Lois Stillman	Please protect endangered species and their habitat. Please, the urgency is to crisis level in Iowa. Thank you for heigtened attention and your work of protection. Iowans love our beautiful state and nation. Please assure the protection of landscapes and wildlife. Do not allow "take" by Mid-American Energy and any wind energy entity to take what took billions of years to deelop. Stop the senseless destruction to all sectors of society. A proposal of 170-198 Industrial Wind Turbines in Palo Alto County Iowa places them near lakes, wetlands, and wildlife areas for rare Golden Eagles, our national bird, and other endangered species as well as migratory bird routes, which illustrates the lack of care in proper siting of turbines.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
78.2	9/24/2018	Thomas and Lois Stillman	Iowa Agriculture relies on a delicate ecosystem. Clearly, harming the pollinators, birds, bats and other endangered species affectes the environment and habitat for all living organisms. Scientific analyses suggest that loss of baths in North America could lead to agricultural losses estimated at more than $3.7 billion/year.	Thank you for your comment. We have incorporated an evaluation of the economics of bat insect consumption into the EIS.

Comment #	Date	Author	Comment	Response to Comment
78.3	9/24/2018	Thomas and Lois Stillman	Protect by placing a moratorium on construction and perating of additional Industrial Wind Turbines by Mid-American Energy and all wind energy developers, owners and operators from harming our ESA further and not allowing a known hazard to contiune. The devastating impact of 519,937 acres of Iowa land already harmed by Industrial Wind Turbines is happening daily with no possibility of mitigating the bast damage for centuries. Protect by requiring responsibility of the industy to provide restitution of Production Tax Credit dollars to taxpayers for the priceless destruction of habitat as well as ESA they have caused since construction and operation. Protect by enforcing fines that require immediate stopping fo false information in advertisements and promotions. Requiring payment of substantial fines of at least 50 million dollars per turbine annually back to our taxpayers to pay back what they owe to our national debt because they are not "enviromentally friendly" nor "clean energy."	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
78.5	9/24/2018	Thomas and Lois Stillman	Cluttering the visual environment with blinking, introducing whooshing noise and twirling magentic-energy pressure waves is not clean rather it is polluting the air with infra-sound and vibrations affecting all living prganisms while obstructing views and flight patterns. Moreover, introducing Vibro-Acoustic disease into our environment contiunes overtime with adverse health effects in humans, animals and living organisms in soil.	The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa.
78.6	9/24/2018	Thomas and Lois Stillman	We plea for your urgent protection by not issuing a permit to "take". Instead, require restitution of all taxpayer dollars. The reckless ruination of rural Iowa, relationships and not following the Golden rule has led to countless dollars of harm to every sector of society as well as robbing future generations of the ability to live in a safe, healthly, high quality beautiful environment. Thank you for your dedication to protection and preservation.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
79.1	10/10/2018	Sierra Club, Iowa Chapter	We believe the draft Environmental Impact Statement (DEIS) starts out on the wrong foot. The DEIS is supposed to state the purpose and need for the federal action. In this case, the federal action is a decision whether to grant an incidental take permit. Section 1.1 of the DEIS states what FWS claims is the purpose and need for the federal action. FWS states, in the last paragraph, that the purpose of the EIS is to: - Respond to an application from MEC requesting an ITP for the incidental take of the federally-endangered Indiana bat, federally-threatened northern long-eared bat, little brown bat, tri-colored bat, and the bald eagle, pursuant to the ESA section 10(a)(1)(B) and its implementing regulations and policies, and the BGEPA; -Evaluate the environmental impacts to the human environment that will occur if an ITP is issued; and - Ensure compliance with the NEPA and other applicable laws and regulations. As stated above, the federal action is the decision whether to issue an incidental take permit pursuant to the Endangered Species Act. However, the purpose and need, as set out in Section 1.1, conflates the need for the EIS under the National Environmental Policy Act with the purpose and need for an incidental take permit. The purpose and need statement under the National Environmental Policy Act (NEPA) is important because the purpose and need statement "necessarily dictates the range of 'reasonable' alternatives." Carmel-by-the-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142 (9th Cir. 1997). The definition of purpose and need must be reasonable. Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190 (D.C. Cir. 1991). There is no way to know if the statement of purpose and need is reasonable unless it is supported by data and evidence. By misstating the purpose and need in the DEIS, FWS has prejudiced the "range of 'reasonable' alternatives." Mischaracterizing the purpose and need skews the entire DEIS toward the desired conclusion promoted by MidAmerican.	We have clarified the purpose and need statement in the EIS to ensure that it more accurately reflects the Service's role in the project and characterizes the "control and responsibility" as stated in 40 CFR 1508.18. Furthermore, the Service followed the directives given for Purpose and Need statements according to the 2016 HCP and ITP Processing Handbook published by the Service and NOAA. As the Sierra Club did not provide an alternative purpose and need statement for the FWS to consider, we cannot respond further on this comment relating to the purpose and need statement.

Comment #	Date	Author	Comment	Response to Comment
79.2	10/10/2018	Sierra Club, Iowa Chapter	The importance of an adequate discussion of alternatives is highlighted by the statement in the NEPA regulations that the alternatives analysis is the "heart of the environmental impact statement." 40 C.F.R. § 1502.14. NEPA demands that the environmental review "rigorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 14(a). There must be a "substantial treatment of each alternative" in an EIS. 40 C.F.R. § 1502.14(b). The most significant alternative not considered in this case is an alternative site for the wind turbines. Proper siting of the wind energy projects might have avoided even having to consider an incidental take permit. As it is, MidAmerican was allowed to site the wind turbines wherever it wanted and then come to FWS for dispensation. This is a classic example of the old saying that it is better to ask for forgiveness than to ask permission. In the Habitat Conservation Plan, § 7.0, MidAmerican brazenly states: Section 10(a)(2)(A)(iii) of the ESA and its regulations . . . require an HCP to provide a description of "what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized." USFWS guidance for developing HCPs suggests to detail among other things, " alternative actions the applicant considered that would not result in take and the reasons why such alternatives are not being utilized," as well as actions that would reduce the take . . . . Because the Projects are already constructed and operating, the only available take alternatives for MidAmerican are limited. By constructing before applying for a permit, MidAmerican has violated NEPA and the Endangered Species Act and regulations. Although FWS may not have direct authority in permitting or approving the siting of wind energy projects, it certainly has the authority pursuant to NEPA to consider proper siting in the first instance as an alternative that must be considered in evaluating the environmental impacts and in granting an incidental take permit. The process whereby MidAmerican can ignore siting considerations and then ask for an incidental take permit violates NEPA and also violates the ESA. In fact, FWS ESA regulations, 50 C.F.R. § 222.307, require "a detailed description of the proposed activity" that will result in the taking of a protected species. Use of the word "proposed" clearly means that an application for an incidental take permit must be submitted before construction of a project. MidAmerican has violated that regulation.	The Service does not have the authority to regulate the siting of wind turbines in Iowa. Rather, the Service has the responsibility to administer the ESA and regulate the taking of listed species. Stated another way, the Service does not have "control and responsibility" (40 CFR 1508.18) for the construction or existence of the turbines. Rather, the Service has "control and responsibility" of the administration of the ESA and related permitting of incidental take. The portion of the project that may cause take is the spinning of the blades at various wind speeds, and therefore that is the portion of the project over which the Service has influence. The alternatives in the EIS were developed around operating turbines at various wind speeds that could cause varying levels of take. Furthermore, we did not carry forward an alternative consisting of alternatives siting for the wind turbines because the majority of the projects were built, or fully through the development phase at the time of the permit application. An alternative including different turbine siting turbines would have required the complete deconstruction of the turbines and their rebuilding elsewhere. 40 CFR 1502.14 calls for the evaluation of a reasonable range of alternatives. Reasonable alternatives are further defined as "those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant" as stated in the "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations." We believe that the relocation of existing turbines does not constitute a reasonable alternative, and we have added a discussion of alternative siting of turbines to Chapter 2 of the EIS.

Comment #	Date	Author	Comment	Response to Comment
79.3	10/10/2018	Sierra Club, Iowa Chapter	One of the most important steps in siting a wind project is to perform on-site evaluations of the bird and bat activity around the project location. This should be done before a final site location is determined. The Iowa Chapter asserts that once the siting has been established, the developers are not going to re-site the project or to stop construction plans, regardless of how many eagles and bats frequent the area. A lot of background activity happens as part of the siting, including efforts to change local ordinances to give preferable treatment to the planned wind project. Plus, the developers already have incurred expenses as part of the siting, land acquisition, and development processes. That is why there is so much push-back by the developers when the local community is offered a chance to comment on a project and the local community identifies eagle, bird, or bat habitat as well as migration paths and habitat for all kinds of birds and bats.	Thank you for your comment. We do not have jurisdiction over pre-construction studies, construction, or siting of wind turbines in Iowa. We do, however, consult with developers under the Land Based Wind Energy Guidelines, which is a voluntary process.
79.4	10/10/2018	Sierra Club, Iowa Chapter	Bald eagles have made a significant come-back in Iowa. Although there are significant numbers of eagles that migrate into the state, beginning in the early fall and continuing into the winter months, there are also increasing numbers of resident eagles and nesting eagles across the state. The Iowa Department of Natural Resources (DNR) is reporting that eagles are nesting in 86 of Iowa's 99 counties.[1] Further the DNR is reporting that it does not have adequate funding to monitor nesting activity, instead relying on members of the public to report nest activity.[2] Traditionally eagles have followed the interior rivers for roosting, perching, and hunting for food. Iowa has a unique food source for bald eagles – dead animals that are piled up at confined animal feeding operations (CAFOs). Eagles will roost on trees that are close to the CAFOs and far from rivers and streams.	Thank you for your comment.
79.5	10/10/2018	Sierra Club, Iowa Chapter	It is especially important to ensure carrion removal from the turbine site, so that bald eagles are not attracted to the turbines. Also important will be efforts to encourage landowners to quickly remove deceased animals, particularly CAFO owners who sometimes have large numbers of deceased animals at a time. We believe Iowa is very unique in several ways. It has become a leader in wind production in the country. As wind projects have expanded across the state, the projects are being developed much closer to wetlands, natural lakes, and prime wildlife habitat. That only increases the risk of collisions. As mentioned above, the eagles have developed an affinity for obtaining food from CAFOs.	Thank you for your comment.
79.6	10/10/2018	Sierra Club, Iowa Chapter	Bats are a particular concern in Iowa and across the country. As large populations of bats succumb to white-nose syndrome, loss of large numbers of bats due to collisions with wind turbines becomes a concern. The loss of large trees has become another issue, in that bats need the trees to roost. Development pressures and clearing land for farming result in the trees being felled. Moving turbines away from bat habitat – mainly trees – solves only part of the problem. The other part of the problem is the migratory corridors. The most likely time of collision happens during the migration	Thank you for your comment.
79.7	10/10/2018	Sierra Club, Iowa Chapter	It is obvious that the taking/killing of little brown bats and tri-colored bats are going to be large. Also, at the rate of 300 bald eagles over 30 years, there will be slightly under one bald eagle killed each month. It is extremely important for Fish and Wildlife Service to frequently and effectively monitor that the levels of birds and eagles taken stay within the permit levels, and not rise above the proposed permitted levels.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
79.8	10/10/2018	Sierra Club, Iowa Chapter	The Sierra Club is questioning whether Fish and Wildlife Service (FWS) should issue the permit for 30 years or for a shorter timeframe, such as for five years. FWS needs to effectively monitor the actual takings each year. Given the huge loss of bats due to white-nose syndrome, FWS may need to significantly reduce the permitted number of bats that can be taken. If more eagles and bats are killed by contact with wind turbines than contemplated under the permit, then FWS needs to be able to work with MidAmerican to further reduce the deaths of eagles and bats, including the following options: 1) Selective curtailment of selected turbines during periods of increased bat and/or eagle activity, 2) Increase efforts to reduce cut-in speed, 3) Requiring MidAmerican to move the turbines causing the greatest loss of eagles and bats to a more satisfactory location. 4) Increased on-the-ground monitoring of bat and eagle activity around turbines throughout the year. A five-year permit gives FWS the flexibility to take a close review of the data in order to make permit levels that are satisfactory to protect bats and eagles.	Thank you for your comment. The Service has revised the discussion of the issuance of a shorter term permit in Chapter 2 of the EIS. Furthermore 50 CFR 17.22 and 50 CFR 17.32, states that "…the Director shall consider the duration of the planned activities, as well as the possible positive and negative effects associated with the permits of the proposed duration on listed species…" A shorter term permit does not meet the need of the applicant to be permitted for the operational life of the projects. From an impacts perspective, a longer term permit provides for a larger amount of mitigation to occur upfront, which is particularly important to consider for forested habitat restoration and enhancement projects. The applicant is implementing annual monitoring and has incorporated a 5 year check-in to ensure that take levels are in compliance with the permit, and/or trigger adaptive management measures to reduce take levels if needed. Changed circumstances also provides for a reduction in bat populations and measures to reevaluate impacts to covered species when that occurs. A discussion of an alternative duration for the permit is provided Chapter 2 of the EIS. Adaptive management measures are outlined in Section 5.5 of the applicant's HCP, and include options for selective curtailment of turbines, curtailing select projects, annual evaluation meetings to determine permit compliance, and a 5-year check-in procedure for evaluating whether or not adaptive management actions are warranted. Also, the Service has added a discussion of alternative siting of turbines to Chapter 2 of the EIS.

Comment #	Date	Author	Comment	Response to Comment
79.9	10/10/2018	Sierra Club, Iowa Chapter	Fish and Wildlife Service needs to effectively enforce the Endangered Species Act, NEPA, and the Bald and Golden Eagle Protection Act. FWS needs to send a loud and clear message to MidAmerican and to all wind developers that they must perform the species studies and apply for a permit before they start construction. Examining alternative sites is part of the NEPA process so that the nation's birds and bats are not destroyed by the wind turbine projects.	Thank you for your comment. The Service cannot require any entity to pursue incidental take coverage, as clarified in the April 26th 2018 Memo from the Principal Deputy Director.
80.1	10/15/2018	Audubon	MidAmerican Energy's investment in a thirty-year commitment for a Habitat Conservation Plan that covers the entire state of Iowa for their 22 wind projects to address current and potential conflicts with Bald Eagles demonstrates a commitment not only to a clean energy economy but also to the conservation of an iconic species of bird that is the symbol of our country, and that Audubon and our members treasure. This commitment leads us to support MidAmerican Energy's 100% renewable energy vision with some confidence that new wind projects will be sited effectively to avoid, minimize and mitigate effectively for their impacts on birds and other wildlife. MidAmerican Energy's policy of prioritization of siting of wind turbines on previously disturbed agricultural lands in Iowa also avoids landscape level impacts on the places birds need now and in the future.	Thank you for your comment.
80.10	10/15/2018	Audubon	**Other birds that are not Covered Species of the HCP.** a. We reiterate comments made above on the DEIS regarding clarification of "non-threatened" and "non-endangered" and "non-listed" or "non-covered" birds.	Thank you for your comment. Noted.
80.2	10/15/2018	Audubon	**Bald Eagle:** Audubon appreciates the additional voluntary funding that MidAmerican provided to support a cooperative research program with the USFWS, West Virginia University and The Peregrine Fund. The research program is designed to understand the ecology of bald eagle movement through telemetry in the upper Midwest to aid in management of a recovering population. We look forward to reviewing this data and request that FWS insure that all data from the HCP and reviews will be made publicly available.	Data associated with an issued permit is considered public and would be publicly available.
80.3	10/15/2018	Audubon	**Adaptive Management:** In addition to targeted curtailment and deterrents this section should also specifically include currently available technologies for **detection and avoidance** of take of Bald eagle as well as technologies which may be developed over the 30 years of the HCP term. This additional option is especially critical and timely if the actual take is greater than the authorized take such that the Preservation standard of the Bald & Golden Eagle Protection Act may be threatened or violated. Although this permit is issued under ESA for Bald Eagle as a Covered Species, for compliance with the Bald and Golden Eagle Protection Act, the Service is bound by the preservation standard set forth in BGEPA.[2] The Service identified take rates of between 1 and 5 percent of the total estimated local-area eagle population as significant, with 5 percent being at the upper end of what might be appropriate under the BGEPA preservation standard, whether offset by compensatory mitigation or not.	Thank you for your comment. A discussion of available technologies for eagle avoidance and minimization, including deterrents have been added into the EIS. Also the HCP addresses the use of technology and deterrents in Section 5.5.2.

Comment #	Date	Author	Comment	Response to Comment
80.4	10/15/2018	Audubon	From the Eagle rule: *The new Eagle Permit Rule provides a mechanism where the Service may legally authorize the non- purposeful take of eagles. However, BGEPA provides the Secretary of the Interior with the authority to issue eagle take permits only when the take is compatible with the preservation of each species, defined in USFWS (2009a) as* ***"...consistent with the goal of stable or increasing breeding populations."*** *The Service ensures that any take it authorizes under 50 CFR 22.26 does not exceed this preservation standard by setting regional take thresholds for each species determined using the methodology contained in the NEPA Final Environmental Assessment (FEA) developed for the new permit rules (USFWS 2009b). The details and background of the process used to calculate these take thresholds are presented in the FEA (USFWS 2009b).* **Comment and Recommendation:** Audubon supports MEC's approach of covering Bald Eagle under an ESA permit and clearly the Eagle rule has provided for this programmatically. FWS should include additional details in the FEIS for the public on how the ESA and Eagle Rule interact, including more detail on how the FWS determined that the Eagle Act's preservation standard will continue to be met over the 30-year term of the HCP by issuance of an ESA permit. Public transparency of data from HCPs under the ESA and Eagle permits under BGEPA is a high priority for Audubon and the public. We have commented on this regularly in our Eagle rule comments since 2009. We appreciate MEC's commitment to transparency by providing detailed project specific data and species specific data not only on Bald eagle interactions with turbines but also on mortality monitoring reports and data on all birds on MEC wind projects. MEC is showing environmental leadership in our opinion in this approach and has provided a precedent that we hope will be repeated by other companies in development and operation of wind projects in Iowa and elsewhere.	Thank you for your comment. A discussion of the issuance criteria, including the BGEPA issuance criteria, is addressed in the Service's Findings document that will be publicly available when the permit decision is made.
80.5	10/15/2018	Audubon	In Cumulative Effects 5.2.2.1 (p. 121) The DEIS calculates an estimate of eagle mortality from existing and potential build out of non-MEC turbines to add to the potential take of eagles from MEC projects. **Comment and Recommendation:** Audubon is concerned about the take that may be occurring on non-MEC turbines in Iowa by developers that have not provided for conservation of Bald Eagles through an HCP or an Eagle permit. FWS should address this issue more thoroughly in the DEIS on how FWS will update this estimate with real data and continue to provide cumulative effects analysis to Bald eagle in the entire HCP Plan Area during the entire term of the HCP of thirty years from all turbines in order to meet the preservation standard for the Local Area Population.	Thank you for your comment. Chapter 5.2 of the EIS describes how we have accounted for the possibility of existing and future bald eagle fatalities from wind turbines in the affected eagle management units. Given that the applicant is conducting mitigation, we expect that their take would not add to the cumulative effects in the region. Also, if eagle take is occurring or occurs in the future at other facilities, and those operators pursue a permit, the Service will provide a cumulative effects analysis with each subsequent permit. Lastly, the Service's Findings Document and Biological Opinion will address cumulative effects in the context of the preservation standard in BGEPA.

Comment #	Date	Author	Comment	Response to Comment
80.6	10/15/2018	Audubon	**Other birds that are not Covered Species of the HCP.** From the DEIS: *Based on data from post-construction fatality surveys (see Section 3.3.2.2.2), the avian fatality rate at MEC's covered projects ranges from 2.28 to 19.79 birds per turbine per year, with an average of 7.21 birds per turbine per year. Using the site-specific estimates where available (see Table 3.3-5) and the average values for facilities without results, an estimated 13,134 birds would be killed each year at MEC's covered projects (Table 4.2-4).* **Comment:** This estimate conflicts with the estimate in 3.3.2.2.2 Post-Construction Fatalities at MidAmerican's Wind Energy Facilities. In that section the DEIR in Table 3.3-5 reports that *A total of 956 birds were discovered during the two years of post-construction monitoring. (p. 39).*The FEIS should discuss how FWS arrived at the final calculation of 13,134 birds including the analysis of scavenger rates and searcher efficiency and any other extrapolation formulas in this section even if it is explained in another section in the DEIS. Additionally, in using "average values for facilities without results" it is unclear whether the DEIS is assigning the average value of all the facilities to the periods where no data is known, or the average value of the actual facility if only one period of data is known. This may alter the average. We would recommend using the average from one period for facilities where only one period of data is known rather than the average of all the facilities. Also, since mortality data for O'Brien was completed in 2017 the August 2018 the FEIS should include this data and the average should be recalculated.	Thank you for your comment. The Service has received the 2017 fatality data from O'Brien, Ida Grove, and Adams. This data has been incorporated into the bird and bat impact calculations in the FEIS.
80.7	10/15/2018	Audubon	**4 Irreversible and Irretrievable Commitment of Resources is deficient and contains omissions.** The DEIS states that *Operation of the 22 covered projects would result in an irreversible or irretrievable loss of some biological resources over the life of the projects, including the covered bats species, bald eagles, non-listed and non-covered bats,* ***and birds****. (Emphasis added, DEIR 5.4, p. 147). The permit-term fatalities of non-listed birds is estimated at* ***394,020 individuals****. (DEIR 5.4, p.147*). **Comment and Recommendation:** The DEIS alternately uses "non-threatened" and "non-endangered" and "non-listed and non-covered" to describe species of birds in its analysis. This should be standardized in the FEIS, or the differences should be explained.	Thank you for your comment. Text has been changed for consistency in the EIS.

Comment #	Date	Author	Comment	Response to Comment
80.8	10/15/2018	Audubon	**Bald Eagle Comment:** We appreciate the proposal of MEC to consider alternate forms of mitigation for Eagles than the FWS approved power pole retrofits. Audubon is a founding member of the American Wind & Wildlife Institute where models and evaluations of these alternative mitigation strategies have been developed. Both NGOs and the industry that are partners and supporters of AWWI support these alternate mitigation strategies. However, MEC should seek to insure that these alternate mitigations are effective and use any models, data or other information from other projects using these alternate mitigations and other relevant criteria to be included in the selection of mitigation projects. Additional Comment: We appreciate the compensatory mitigation MEC has offered for all Bald eagle take under the ESA which provides for more conservation of eagles than may be required for an Eagle permit under the Bald and Golden Eagle Protection Act. **Comment and Recommendation:** The HCP is for 30 years. Although MEC states that "cumulative impacts are expected to remain within levels that would be sustainable for bald eagle populations in the Plan Area" there is always the possibility that wintering populations of Bald Eagles in the Plan Area may change over the 30 years or take levels may exceed 5% over that long period. While it may be the intent for MEC to consider detection and avoidance technologies as has been outlined in the HCP and in Changed Circumstances 8.2.5, we recommend that these technologies be specifically included as an avoidance or minimization option as discussed in our comments on 2.2.1.1.7 Adaptive Management of the DEIS.	Thank you for your comment. The applicant has included provisions for advanced conservation practices in their adaptive management and changed circumstances sections (Sections 5.5 and 8.2, respectively) that they feel are commensurate with the proposed level of taking. The applicant has determined that new and developing technologies, such as detection and avoidance systems, are best considered under changed circumstances in the HCP because further research is currently required to demonstrate the effectiveness of these technologies. The Service has added an evaluation of detection and avoidance measures into Chapter 2 of the EIS.

Comment #	Date	Author	Comment	Response to Comment
80.9	10/15/2018	Audubon	**Comment and Recommendation:** Audubon is concerned about the take that may be occurring on non-MEC turbines in Iowa by developers that have not provided for conservation of Bald Eagles through an HCP or an Eagle permit. FWS should address this issue more thoroughly in the DEIS on how FWS will update this estimate with real data and continue to provide cumulative effects analysis to Bald eagle in the entire HCP Plan Area during the entire term of the HCP of thirty years from all turbines in order to meet the preservation standard for the Local Area Population.	Chapter 5.2 of the EIS describes how we have attributed potential take to existing wind facilities and projected build out. We have accounted for the possibility of currently ongoing and future bald eagle fatalities from wind turbines in the affected eagle management units, and incorporated these assumptions into our evaluation of cumulative effects. Given that the applicant is conducting mitigation, we expect that their take would not add to the cumulative effects to bald eagle populations in the region. Also, if eagle take is occurring or occurs in the future at other facilities, and those operators pursue a permit, the Service will provide another cumulative effects analysis with each subsequent permit. The Service continuously tracks bald eagle fatality rates from various sources, including wind energy, through the "Cumulative Effects Tool". Lastly, the Service's Findings Document and Biological Opinion will address cumulative effects in the context of the preservation standard in BGEPA, as directed by 50 CFR 22.11.

Comment #	Date	Author	Comment	Response to Comment
81.1	10/1/2018	Donald De Neui	I don't know what kind of comments you want. We have one tower situated on 80 acres of CRP Pheasant SAFE reserve. I make weekly trips to oversee the reserve as to potential trespassing, etc., including around the Wind Tower. I have not seen even one bird fatality even though there are various kinds of hawks, turkey vultures, and other small birds flying around but they seem to know how to avoid flying near the tower. I have not seen any bald eagles nor any bats. We have only one small soft maple tree on the entire 80 acres.	Thank you for your comment.
82.1	10/9/2018	Sharee Holder	I have lived in Iowa my entire life. One of our greatest treasures is the wide variety of animals and how they fit together forming our amazing wildlife. To reduce their take, MidAmerican Energy (MAE) states they will feather their turbines during certain hours in order to reduce turbine/bat collisions. Collisions are not required to kill the bats. They explode when they approach the spinning blades. MAE also states they plan to reduce scavenging opportunities - a.k.a. remove food sources. If their feeding opportunities disappear, so do the animals. Animals driven from their habitats is one of the major causes of extinction, yet this is what they are proposing. MAE states they will repair and maintain the habitats of the endangered animals. If the endangered animals have been killed by the turbines or have been chased away because of reduced feeding opportunities, what difference does it make if their habitats are repaired or maintained. Nature exists by maintaining a delicate balance. When these endangered predators are killed and driven from their habitats, their ecosystems are thrown out of balance while the populations of their prey are allowed to multiply unchecked. For these reasons, I ask that you reject the application for an incidental take permit requested by MidAmerican Energy.	Section 10 of the Endangered Species Act and associated Bald and Golden Eagle Protection Act regulations provides a mechanism by which incidental taking of listed species and eagles by any entity may be authorized if the application and HCP meets issuance criteria. The Service's evaluation of these criteria will be included in the Findings document associated with the permit decision.
83.1	10/9/2018	Connie ArterGriebenow	The impact on habitat from Wind Turbines in Guthrie County is minimal because turbines in that county have been primarily on farms where crops are already growing and trees have already been cleared for agriculture purposes. The farms are century farms, so trees and wildlife habitat has been cleared for farming for a long period of time and wildlife has adapted to the changes. As far as inflight kill; research on bats shows bats have better tracking senses of surroundings than humans can imagine. Migrating birds generally fly higher than turbine structures. We are in a crisis with energy sources that do not impact our air quality and create global warming. The trade off is difficult, but wildlife has adapted to humans since our creation. They, the wildlife, will applaud us for saving the planet that they share with us.	Thank you for your comment.

Comment #	Date	Author	Comment	Response to Comment
84.4	10/16/2018	Anonymous, Anonymous	Dear Ladies and Gentlemen, On behalf of Resident Rights Coalition of Madison County (RRCMC), I hereby submit these comments on the Draft Environmental Impact Statement and Draft Habitat Conservation Plan that were prepared as a required part of MidAmerican Energy Companys (MidAmerican) application for an incidental take permit as required by the Endangered Species Act (ESA). RRCMC is strongly opposed to MidAmericans proposal to harm, harass, wound, and kill wildlife as a result of wind turbine construction and operation in our Madison County, Iowa community. RRCMC is strongly opposed to MidAmericans proposal to significantly modify wildlife habitat as a result of wind turbine construction and operation in our Madison County, Iowa community. The draft EIS and HCP propose to cover 22 project locations in 22 separate counties. MidAmerican has applied for an Incidental Take Permit in anticipation of killing and harming protected species in any or all of these locations. Although all of the included locations are within Iowa, each project site is unique in terms of the community factors, land uses and characteristics, and ecosystems. MidAmerican should propose specific measures for minimizing and mitigating ecological harm for each of these project locations with separate HCPs that are specific to each project location. Some of the communities impacted by wind turbine development are overwhelmingly in support of the projects, while others are strongly opposed. Madison County is characterized by beautiful rolling hills and meandering waterways with wooded areas that provide excellent habitat for wildlife. While there are certainly row crop lands in our area, many farmers here raise livestock and grow crops such as alfalfa that are used for livestock food. These activities are particularly well suited for hilly areas which are not ideal for row crop farming. We value our native wildlife and endeavor to protect and enhance critical habitat areas that support bats, eagles, bees, and other wildlife. Resident Rights Coalition of Madison County is strongly opposed to MidAmericans proposal to negatively impact species that we love including the federally endangered Indiana bat, federally threatened northern long-eared bat, and federally protected bald eagle, in addition to the little brown bat and tricolored bat. We are specifically opposed to the statewide permit covering so many sites at once. Please respond to our comment and request that FWS requires individual permits and HCPs at each of the sites in Iowa proposed to be developed by MidAmerican. Thank you for your consideration of our concerns. Sincerely, Resident Rights Coalition of Madison County Kandi Beaman, spokesperson	Thank you for your comment. The federal action under review at this time is the issuance of a permit for the taking of the species covered under the HCP by 22 operational projects. We do not have jurisdiction over the construction or siting of wind turbines in Iowa. We have added a consideration of the alternative of individual HCP's for single projects into the EIS.

Comment #	Date	Author	Comment	Response to Comment
85.1	10/16/2018	Anonymous, Anonymous	I support sustainable wind development. As an Iowa native, I support offsetting the bat and eagle take in Iowa, where the impacts would occur. I encourage Fish and Wildlife Service to support transparent and responsible wind incidental take permitting by issuing a permit to Midamerican and finalizing the Environmental Impact Statement. Iowa needs renewable energy, and there is more threat to sensitive species from climate change than from responsible wind like Midamerican.	Thank you for your comment.
86.1	10/15/2018	The Nature Conservaancy (TNC)	The Nature Conservancy supports renewable energy development as a strategy to reduce greenhouse gas emissions. Iowa and MidAmerican Energy are leaders in renewable wind energy production. We understand that energy development, appropriately sited and guided by landscape-level application of the mitigation hierarchy, can support the development of wind energy in Iowa and ensure the viability and persistence of sensitive species and their habitat. We commend MidAmerican for its commitment not only to a landscape-scale approach to the conservation of the Covered Species, but also for its coordination with both the U.S. Fish and Wildlife Service and the State of Iowa.	Thank you for your comment.
86.2	10/15/2018	The Nature Conservancy (TNC)	The HCP notes that "MidAmerican's Projects are located in areas dominated by agriculture, which avoids the removal of forest vegetation that is typically used by the Covered Species and minimizes environmental impacts to sensitive species and habitat" (Section 5.3.1). In comments submitted by the Conservancy in May 2016, we recommended a variety of sources of information to inform habitat impact avoidance measures, including landscape-level plans and strategies that identify areas of concentrated grasslands and/or forests, designated and proposed Bird Conservation Areas (BCA), and priority areas identified in the State Wildlife Action Plan (SWAP). While MidAmerican evaluated land cover in each of the project areas (Section 3.1 and Appendix A), we encourage MidAmerican to consider other important sources of information on natural habitats and conservation priorities in the project areas in particular, the Iowa State Wildlife Action Plan, as well as independent research on habitat for the covered species.	Thank you for your comment. The applicant has chosen to prioritize information from the studies conducted at the covered projects and the HCP Planning Assistance grant supporting studies. However, conservation priorities from other relevant plans will be considered by the Mitigation Review Team during the implementation of the mitigation activities.
86.3	10/15/2018	The Nature Conservancy (TNC)	We strongly recommend that in the final HCP, MidAmerican include analysis of habitat range for the covered species and cross-reference and/or overlay this data with landscape-level plans, strategies, BCAs, and SWAP priority areas to ensure consistency among conservation priorities and to identify mutually recognized and potentially higher priority areas for avoidance within the habitat for the covered species.	Thank you for your comments.

Comment #	Date	Author	Comment	Response to Comment
86.4	10/15/2018	The Nature Conservancy (TNC)	With regard to the operational avoidance and minimization measures outlined in the HPC, the Conservancy is supportive of the feathering of turbines described in 5.3.2 but we question the discrepancy between the HCP's goal of a 35% reduction in take and Bat Conservation International's (BCI) research which identifies the potential to reduce bat fatalities by up to 93% (http://www.batcon.org/our-work/regions/usa-canada/wind2/operationalminimization). The Conservancy recommends researching the disparity and making any necessary adjustments that could move the reduction in take closer to the results identified in BCI's research.	It appears that BCI's research into feathering below manufacturer's cut- in speed also yielded a 35% reduction in bat fatality rates, which corresponds to the expected reduction in the HCP. BCI's research also indicates that feathering at higher wind speeds can reduce fatalities up to 93%. MidAmerican has compared lost energy generation to reductions in bat fatality rates, and proposed the conservation measures that they believe to be commeasurate with the taking. The Service's evaluation of issuance criteria will be provided in the Findings document associated with the permit decision.
86.5	10/15/2018	The Nature Conservancy (TNC)	Mitigation The Nature Conservancy supports the appointment of the Iowa Natural Heritage Foundation (INHF) as the Mitigation Entity for this HCP. The Conservancy has worked with INHF on conserving land in our state for the last thirty-plus years and know them to be a trusted partner and exceptionally capable organization. As a result, the Conservancy recommends an alternative to the Selection of Mitigation Projects process laid out in 5.3.3.3. Rather than having "MidAmerican and the USFWS select an alternative entity to assist in the implementation of the conservation fund," in the event INHF is unable to perform its duties, we recommend granting INHF the ability to subcontract funding from the Bat and Eagle Conservation Funds, as needed. The ability to subcontract would increase the efficiency and effectiveness of the mitigation implementation by allowing INHF to capitalize on partner relationships, in addition to their own capacity. This will also expand the pool of projects available as it can open it up to landowners more familiar with a local county conservation department or other NGO's, and thus more likely to participate if that entity were involved.	Thank you for your comment. The INHF will serve as the primary mitigation entity, but the plan does not exclude the option to include other stakeholders and/or entities in the mitigation. This has been clarified in the HCP.

Comment #	Date	Author	Comment	Response to Comment
86.6	10/15/2018	The Nature Conservancy (TNC)	With respect to the types of mitigation projects to be funded, the Conservancy recommends less emphasis on protection of man-made structures (i.e. barns) in the Bat Conservation Fund. We recognize that such structures can serve as maternity colonies but believe the protection of such structures to be more beneficial for little brown bats (LBBA) than for northern long-eared (NLEB) or Indiana bats (INBA). Again, recognizing that INBAs have been documented using man-made structures, such as in Iowa Ammunition Plant 2003 Indiana Bat Investigation (Chenger, 2003), it is our impression that this is the exception, not the rule. We recommend less emphasis on this strategy and/or to modify the strategy to require that the practice show more significant benefit to INBA and/or NLEB than to other non-listed species. Similarly, with tree planting, which is identified in 5.3.3.1 as an appropriate conservation/restoration measure on owned (i.e. protected) land. While the Conservancy has no concern regarding the planting of native trees to provide long-term habitat, we don't believe plantings will provide benefit to the listed species within the first year, or even the first three years (a priority indicated in 5.3.3.3). Tree planting would more likely benefit tri-colored bats (TRBA) over the course of the permit, since the young trees will primarily provide foliage roosting opportunities during that period, not the bark or cavity roosting opportunities needed by NLEBs or INBAs.	Thank you for your comments. Mitigation using artificial roost structures is geared primarily toward the little brown bat, as described in section 5.3.3.1. The applicant intends to implement both preservation and restoration of forested habitats to accommodate the needs of all covered species. This has been clarified in the HCP.
86.7	10/15/2018	The Nature Conservancy (TNC)	More generally, the strategy of focusing solely on maternity colonies for the preservation of the species at risk gives us pause. It's documented that white-nose syndrome (WNS) poses a tremendous threat to large colonies, whereas wind turbines pose a greater threat to small colonies that may be less threatened by WNS (Erickson, Thogmartin, Diffendorfer, Russell and Szymanski, 2016). The authors suggest that protection of the small winter colonies may be an important part of the overall strategy to protect INBA. The Conservancy strongly recommends this be an important part of the protection strategies in the HCP's mitigation program.	Thank you for your comment. To the best of our current knowledge, there are no unprotected winter colonies of Indiana bats within the plan area. If any should be discovered as the HCP is being implemented the mitigation review team will consider their protection as an important option for mitigation.

Comment #	Date	Author	Comment	Response to Comment
86.8	10/15/2018	The Nature Conservancy (TNC)	Additional Comments When considering the potential changed circumstance wherein WNS impacts greatly reduce the populations of covered species (Section 8.2.2), we would argue that a trigger point of a 90% reduction in covered bat species is not a "substantial reduction," but rather catastrophic, as detailed in White-nose syndrome is likely to extirpate the endangered Indiana bat over large parts of its range (Thogmartin, et al., Biological Conservation, Vol. 160, April 2013, pp 162-172). This level of reduction would be in excess of the level of colony collapse/extirpation. We recommend consulting the research and the author to determine a more conservative trigger point.	Thank you for your comment. The applicant has revised this trigger point to occur at 80%, which is approximately the midpoint of long term monitoring of population declines in Indiana bat populations in the northeast and Appalachian Mountain regions of the U.S. (Turner et al. 2011, USFWS 2017). Also, the Service uses the Thogmartin et. al. Indiana bat population model to evaluate the effect of the taking of Indiana bats and determine if the permit application meets issuance criteria. The Service is using this model, and other relevant species population information to inform the permit decision.

Comment #	Date	Author	Comment	Response to Comment
87	10/3/2018	Katie Rock; Center for Rural Affairs	The Center for Rural Affairs is a non-profit established in 1973 and based in Lyons, Nebraska and an office in Nevada, Iowa. The Center works to promote social and economic justice, environmental stewardship, and strengthen rural communities. Essential to these goals is bringing new opportunities to rural communities and assisting them identifying ways to improve their lives. Renewable energy development, especially wind energy, has proven to be such an opportunity for rural Iowa. General Comments Iowa has claimed a position as a leader in wind energy with the potential to produce 772,722 megawatts from wind according to the National Renewable Energy Laboratory (NREL). Currently Iowa generates about 37% of its electricity from wind energy, ranking it third in the nation for wind energy production. While wind energy has proven to be an effective economic development tool that has been embraced by the state, it is also essential that project developers and operators take steps to avoid impacts on vulnerable animal species in the region that could be affected by wind energy systems. The draft habitat conservation plan is a useful blueprint and stands as a good example for other generation owners and operators. Avoidance, mitigation, and conservation are important components of wind energy development and operation. It is clear from this plan that MidAmerican intends to make the efforts necessary to avoid harm when possible, mitigate impacts where present, and identify opportunities for conservation of impacted species. Technology Integration MidAmerican has made large investments in research to understand the demographics and habits of protected species in Iowa and nationally. This effort has a track record of success in helping to avoid and minimize potential impacts. While this plan includes mitigation measures and outlines procedures for adaptation, there should be a clearer focus on integrating new technology. Over the lifespan of the permit there will likely be new technologies that could reduce the impact of generation systems on wildlife. Many technological developments on the horizon could significantly improve attempts at habitat conservation and avoiding collisions with several species included in this plan. It would be good practice to include a process for assessing new technologies, the benefits and drawbacks to avoidance and conservation they present, and the potential for integrating these technologies into existing systems to meet the goals of this plan. Acquisition Process Avoidance and mitigation is only half of the focus of MidAmerican's conservation plan. MidAmerican's first goal focuses on contributing to the long-term persistence of covered species with projects that support the survival and recovery in Iowa. This objective is achieved through funding to acquire, protect, and restore habitat in large blocks for the covered species. The acquisition of acres for habitat conservation and restoration is a positive inclusion, but there is a missed opportunity to include more potential partners and other stakeholders to support this effort. Identifying partners may be particularly important if MidAmerican does in fact intend to protect or build up artificial structures such as barns to provide habitat for bat species. While it isn't necessary to offer an exhaustive list, including a process that allows MidAmerican to identify potential partners and incorporate their insight or expertise into the efforts outlined in this plan would demonstrate commitment to including a broad group of stakeholders on conservation and improvement measures. Iowa has numerous groups and organizations that work to preserve habitat or the structures that can act as habitat, and they can also assist in publicizing the conservation efforts and further building support for preserving habitat. By broadening the involvement of organizations and stakeholders, MidAmerican could potentially lower the long-term costs of habitat conservation and increase awareness of pressures like white nose syndrome and overuse of pesticides. It would be helpful as part of this plan if MidAmerican could outline a proposal for identifying potential partners and gathering stakeholder feedback for ongoing conservation measures related to projects. Conclusion As wind energy continues to expand in Iowa, it would reassure the public if utilities and transmission provides presented a unified effort on implementing their habitat conservation plans. The committed efforts described in this plan should be demonstrated for all parties looking to invest in Iowa. As rural communities are asked to carry the growing renewable energy infrastructure it should not come at the expense of our natural world.	Thank you for your comments. Your recommendation to provide more clearly for new technologies and include other stakeholders in the mitigation process has been provided to the applicant. The recommendation to coordinate the implementation of habitat conservation plans among utilities is outside of the scope of our jurisdiction under this federal action. However, the Service will endeavor to take this into account as we coordinate with other entities on HCP's.

Comment #	Date	Author	Comment	Response to Comment
88	10/15/2018	Margaret Pino	For Consideration- How does the "take" permit justify the harm to bats when the State of Iowa prohibits anyone from harming or killing bats? Related to a September 21, 2018 article in the Des Moines Register newspaper titled...show some respect, experts say-"bats are critical part of Iowa's environment." The eat insects such as beetles, moths and mosquitos. "A colony of 150 adult brown bats eat as many as 18 million crop-destroying rootworms each summer..." How are the benefits of insect eating bats measured and calculated into this plan? Obviously a key ecosystem benefit to the public, reducing mosquitos and rootworms. Are the benefits of bats included in the plan? Was this considered in the environmental impacts? The benefits of bats? (Take into consideration the increase in mosquitos after rain or the July 2018 historic flooding). Versus chemical spraying for mosquitos or in the case of rootworm-commercial insecticide usage and impacts, cost account for yield loss and cost account for treatment expense. Added harvest costs, economic impact. Were any of these included in the evaluation and will they be considered? Is there a plan in place for the migration period when bats will migrate south? Will this be considered? How do the federal production tax credits play into this plan? Do taxpayers ultimately pay for any of these costs? What is the process and timeline for the mitigation funding and do taxpayers ultimately pay any part of this? A 30 year take permit seems extreme, were shorter year permit periods considered? How are the length of the permit periods decided upon? What is the process and determination and can that be adjusted? Please email me the web link to the Draft EIS when it becomes available. Thank you for your consideration. Margaret Pino 1580 E. McKinley Des Moines, Iowa 515-979-6759	Thank you for your comments. An analysis of the foraging and economic implications of bats has been added into the EIS. A discussion of the timing and implementation of conservation measures during the bat migration season is included in the HCP. The applicant may not use federal funding to implement a Section 10 permit. The final HCP will provide a more detailed description of the funding assurances used for the plan. A discussion of the production tax credit is outside of the scope of this federal action and EIS, as this action involves impacts to covered wildlife species. The discussion of timelines for mitigation funding has been expanded and clarified in Chapters 6 and 8 of the HCP. The requested permit term is submitted by the applicant, and the process for considering permit durations can be referenced in the Service's HCP Handbook, section 12.9. A discussion of a shorter permit term is also included in Chapter 2 of the EIS.

Comment #	Date	Author	Comment	Response to Comment
89	9/27/2018	Katie Rock; Center for Rural Affairs	Okay. My name is Katie Rock with the Center for Rural Affairs. And my comment was that this plan is a very useful blueprint and stands as a good example to show what measures, you know, wind energy used to do to avoid and mitigate, you know, conservation -- I think take is the word I'm thinking of. And I think it's a good example for other states in the Midwest as with expanding. But my one concern is that over a thirty year time period, what can be done if new technology becomes availbale, both for turbines, and, you know, to, for example, make new habitat structures or as we learn more about the population dymanmics of if white-nose syndrome changes the math of kind of affecting that as the population? What happens to the permit?	Thank you for your comment. Provisions for population changes, as well as adaptive management to address changes in the take rate and new technologies are provided in the HCP (Chapter 8.2, and 5.5, respectively).
90	9/27/2018	Tammy Baier	Tammy Baier. But it's on behalf of Gene Hawkins (ph). He's a landlord of ours. He lives in New Mexico. He's spent sixty years both on the study and practice for forestry, agriculture, and environmental sicence and he has also served as a disciplinary team leader for a number of environmental analysis and he's also authored several environmetnal impact statements and environmetnal asssessment reports. He did send me an e-mail with his concern, and I won't read all of it. But the one thing I think just -- I just prsesed with this young lady over here, the tiering procedure -- I'm just going to read what he has to say. The tiering procedure outlined by the U.S. Fish and Wildlife Services on tehir website regarding wildlife and wind farms leave the monitoring of the species mortality caused by the proposed action up to the entities established in operating the wind farm. Is this not a classic case of the fox guarding the chicken coop? That was my only concern - will the U.S. Fish and Wildlife, which I think they will, be working with the MidAmerican people to be sure that the monitoring is not one-sided? And that was like, my question on, you konw, where it's a thirty year project, if we're watching it closer than thirty years, so if something is going wrong, we can catch it before a species would be extremely endangered. I just wanted to share that with you. Thank you.	Thank you for your comment. A description of the monitoring and reporting procedures are provided in the HCP, including requirements for reporting and accountability to the U.S. Fish and Wildlife Service.

APPENDIX F – SUMMARY OF CHANGES MADE TO FEIS

Revisions made to the DEIS, which are reflected in this FEIS, are summarized below:

- Formatting
  - Section numbers, table numbers, and page numbers may have change throughout the document.
- Addition of appendices
  - Appendix E – Summary of Responses to Comments Received on the HCP and DEIS
  - Appendix F – Summary of Changes Made to the DEIS in Preparation of the FEIS
- Cover Sheet
  - Addition of this section, including Title, Subject, Lead Agency, Abstract, Contact, and Transmittal information.
- Addition of Alternative E
  - In response to public comment, an alternative consisting of feathering all turbines below 6.0 m/s during the entire bat active season (March 15 – November 15) was added to the document as "Alternative E".
  - Additions were made throughout the entire document, wherever Alternatives and environmental effects, by Alternative, are discussed.
  - Updated text throughout the document to refer to seven alternatives and six action alternatives.
  - Updated take estimates and percentages throughout to reflect new estimates.
- Section 1.1 Purpose and Need
  - Per public comments received, revised the purpose and need statement
    - Reorganization of paragraphs and addition of paragraphs two and three, which further details the Service's purpose (paragraph three) and need (paragraph two).
- Section 1.4.2 Draft EIS Public Review
  - Addition of this section, summarizing the public review process
- Section 2.1 Development of Alternatives
  - Elaborated on how the elements listed in Table 2.1-1 would change how the permit would be issued (Section 2.1) and why certain elements were eliminated (Sections 2.1.1.1, 2.1.1.2, and 2.1.1.3.1).
  - Per public comments received, added an evaluation of additional components of alternatives (Table 2.1-1; Sections 2.1.1.1, 2.1.1.2, and 2.1.1.3.1) considering different permit structures (22 separate HCPs), considering the incorporation of additional eagle minimization measures, and considering alternative siting of turbines.
- Section 2.1.1 Screening of Alternative Elements
  - Clarified what "not reasonable to implement" means.
- Section 2.2.1.1 Alternatives Carried Forward for Detailed Analysis
  - Section 2.2.1.1.2 Bald Eagle Minimization
    - Changed language to represent the current feasible, rather than known, minimization measures that can be implemented at the scale of the covered projects, rather than within an operating wind farm.
  - Section 2.2.1.1.5 Covered Bats Mitigation
    - Added assumption that the same implementation and authorized take rate structure identified in the HCP would be implemented in the alternatives and that take rate and associated mitigation is analyzed as the maximum impact.
  - Section 2.2.1.1.6 Post-Construction Monitoring
    - Extended post-construction monitoring dates for weekly road and pad searches at all turbines during the peak bat fatality period to October 15.
  - Section 2.2.1.7 MEC's HCP Alternative

        - Updated maximum acres of summer bat habitat protection and/or restoration for mitigation under MEC's HCP Alternative.
- Section 3.2 Resources Considered, But Dismissed from Detailed Analysis
    - Section 3.2.2 Non-Listed, Invasive, Rare, Threatened, or Endangered Plant Species
        - Referenced what forested habitat preservation and enhancement activities may involve, as identified in section 5.3.3.1 of the HCP.
        - Changed language to state, and explain why, rare, threatened, or endangered plant species are not expected within forested mitigation areas; however, if they are present stated that if negative impacts cannot be avoided, consultation with the IADNR will be conducted.
    - Changed language to clarify phrases such as "is expected to" (Section 3.2.4) and "would be" (Section 3.2.6)
- Section 3.3.2.1 Bats Not Listed Under the ESA or Covered by the HCP
    - Added an evaluation of the foraging and economic value of bats, per public comments received.
    - Changed "appear to be" to "are" in relation to migratory tree bat susceptibility to impacts from wind energy facilities
    - Stated that population sizes for migratory tree bat species are currently unknown.
    - Section 3.3.2.1.2 Post-Construction Monitoring
        - Changed to 21 of MEC's covered projects where post-construction monitoring has been conducted. Deleted statement about monitoring results not yet available for Ida Grove and O'Brien.
        - Table 3.3-1: Added/updated bat fatality estimates for the Adams, Ida Grove, and O'Brien facilities, based on post-construction monitoring reports that were made available after publication of the draft EIS (Bay et al. 2017b; Baumgartner et al. 2018a).
        - Updated total bat fatalities and non-listed and non-covered bat fatalities recorded to-date in accordance with the newly available post-construction monitoring data.
        - Table 3.3-2: Updated species composition of bat fatalities to include data from Bay et al. 2017b and Baumgartner et al. 2018a.
- Section 3.3.2.2 Birds
    - Revised "non-threatened and non-endangered" to "non-listed," per public comments received
    - Section 3.3.2.2.2 Post-Construction Fatalities at MidAmerican's Wind Energy Facilities
        - Changed to 21 of MEC's covered projects where post-construction monitoring has been conducted. Deleted statement about monitoring results not yet available for Ida Grove and O'Brien.
        - Table 3.3-5: Added/updated bird fatality estimates for the Adams, Ida Grove, and O'Brien facilities, based on post-construction monitoring reports that were made available after publication of the draft EIS (Bay et al. 2017b; Baumgartner et al. 2018a).
        - Updated text throughout this section for total bird fatalities, as well as number of and distribution of species and species groups recorded as fatalities to reflect the new data.
        - Changed to nine most common species because there were multiple species tied for tenth at 25 fatalities.
- Section 3.4.2.1.1 Bald Eagle
    - Section 3.4.2.1.1.4 Occurrence in Iowa
        - Added citation for eagle-focused post-construction monitoring report for the Ida Grove and O'Brien facilities (Baumgartner et al. 2018b).
        - Table 3.4-1: Added citation (Baumgartner et al. 2018b) and data (no recorded eagle fatalities) for the Ida Grove and O'Brien facilities.
- Section 3.4.2.1.2 Golden Eagle
    - Section 3.4.2.1.2.4 Occurrence in Iowa
        - Added citation for eagle-focused post-construction monitoring report for the Ida Grove and O'Brien facilities (Baumgartner et al. 2018b).
- Section 3.4.2.2.1 Indiana Bat

    - Section 3.4.2.2.1.4 Occurrence in Iowa
        - Added total bat fatalities recorded in 2017 and 2018, none of which were Indiana bats (Bay et la. 2017b; Baumgartner et al. 2018a).
- Section 3.4.2.2.2 Northern Long-eared Bat
    - Section 3.4.2.2.2.4 Occurrence in Iowa
        - Added total bat fatalities recoded between March 16, 2017, and March 15, 2018, none of which were northern long-eared bats (Baumgartner et al. 2018a).
- Section 3.4.2.2.3 Birds
    - Added details on the piping plover and least tern range in Iowa and statement that none were observed during avian use surveys or post-construction monitoring (WEST 2016c; Bay et al. 2016a, 2017a, 2017b; Baumgartner 2018a).
- Section 3.4.2.3.1 Little Brown Bat
    - Section 3.4.2.3.1.1 Status and Distribution
        - Added population size estimate of 8 million little brown bats before WNS (Russell et al. 2015).
    - Section 3.4.2.3.1.3 Occurrence in Iowa
        - Added estimated population size for little brown bats of up to 420,000 in Iowa (Russell et al. 2015).
        - Updated number of facilities and percent of all bat fatalities for little brown bats.
        - Table 3.4-4: Updated little brown bat fatalities at the Ida Grove and O'Brien facilities (none at either facility)
- Section 3.4.2.3.2 Tr-colored Bat
    - Section 3.4.2.3.2.4 Occurrence in the Plan Area
        - Updated number of tri-colored bat fatalities and percent of all bat fatalities.
        - Table 3.4-5: Corrected values for tri-colored bat fatalities at the covered projects and updated data for the three projects monitored 2016-2017 or 2017-2018.
- Section 4.2 Wildlife Resources
    - Added language to explain BMPs, their voluntary nature, and the impacts that could occur if they are not implemented.
    - Removed BMPs relating to unguyed MET towers and construction staff being trained on the BBCS and wildlife avoidance and minimization measures. This deletion was done because those BMPs are not relevant to the covered activity of operations, not because those BMPs were not or would not be implemented
- Section 4.2.2 Bats Not Listed Under the ESA or Covered by the HCP
    - Section 4.2.2.1.2 Fatality
        - Updated the average bat fatality rate per turbine per year and the total estimated number of bat fatalities at the covered projects.
        - Table 4.2-1: Updated the average fatalities per turbine for the Adams, Ida Grove, and O'Brien facilities, as well as the assumed fatality rate for the State Fair Turbine, based on the updated average fatality rate across all covered projects.
        - Updated the species composition distribution used for the analysis of the seven alternatives
        - Updated the species composition and estimated fatalities per year and over the permit term for the no operation adjustment scenario, No Action Alternative (Section 4.2.2.1.2.1), Alternative A (Section 4.2.2.1.2.2), Alternative B (Section 4.2.2.1.2.3), Alternative C (Section 4.2.2.1.2.4). Alternative D (Section 4.2.2.1.2.5), and the HCP Alternative (Section 4.2.2.1.2.6).
        - Table 4.2-2: Updated the summary of estimated fatalities for non-listed and non-covered bats by alternative in accordance with changes made throughout Section 4.2.2.1.
    - Section 4.2.2.2 Mitigation Effects

        - Table 4.2-3: Updated maximum acres of Habitat Protection/Restoration under the HCP alternative.
- Section 4.2.3 Birds Not Listed Under the ESA or Protected by BGEPA
    - Section 4.2.3.1.2 Fatalities
        - Updated the average bird fatality rate per turbine per year and the total estimated number of bird fatalities at the covered projects.
        - Table 4.2-4: Updated fatalities per turbine, fatalities per year, and fatalities over permit term for the Adams, Ida Grove, and O'Brien facilities; updated the assumed fatality rate for the State Fair Turbine in accordance with the updated average; updated the total fatalities per year and total fatalities over the permit term.
        - Updated text throughout section in accordance with updated fatality information in Table 4.2-4.
        - Table 4.2-5: Updated species, percent of fatalities, annual estimate, and permit term estimate in accordance with data from the Adams, Ida Grove, and O'Brien facilities; added population estimates and sources for species not previously listed, as necessary.
        - Added paragraph about timing of Nashville warbler fatalities at the covered projects.
    - Section 4.2.3.2 Mitigation Effects
        - Deleted Table 4.2-6 and referenced Table 4.2-3 instead, which has the same information.
- Section 4.3.2.1 Bald Eagle
    - Section 4.3.2.1.1.2 Fatalities
        - Removed sentence stating no anticipated collision mortality because all MET towers are unguyed and removed sentence stating no anticipated electrocution mortality at generation tie lines. This was deleted because it is not related to the covered activity of operations.
- Section 4.3.3 Federally-listed species
    - Section 4.3.3.1 Indiana Bat
        - Section 4.3.3.1.1.2 Fatalities
            - Added language to account for MEC's assumptions that fatalities are evenly distributed among turbines and that the most conservative fatality estimate is derived from a 35% reduction in fatalities of Indiana bats.
        - Section 4.3.3.1.1.3 Summary of Fatality Impacts
            - Added clarifying statement that take will be fully offset through mitigation and that Indiana bat take is expected to be minor.
            - Table 4.3-1: updated HCP Alternative numbers using MEC's assumptions and updated in numbers in text to reflect changes.
        - Section 4.3.3.1.2 Mitigation Effects
            - Deleted Table 4.3-2 and referenced Table 4.2-3 instead, which has the same information.
    - Section 4.3.3.2 Northern Long-eared Bat
        - Section 4.3.3.2.1.2 Fatalities
            - Added language to account for MEC's assumptions that fatalities are evenly distributed among turbines and that the most conservative fatality estimate is derived from a 35% reduction in fatalities of northern long-eared bats.
        - Section 4.3.3.2.1.3 Summary of Fatality Impacts
            - Added clarifying statement that take will be fully offset through mitigation and that Northern Long-eared bat take is expected to be minor.
            - Table 4.3-2: updated HCP Alternative numbers using MEC's assumptions and updated in numbers in text to reflect changes.
        - Section 4.3.3.2.2 Mitigation Effects
            - Deleted Table 4.3-4 and referenced Table 4.2-3 instead, which has the same information.

- Section 4.3.4.1 Little Brown Bat
  - Section 4.3.4.1.1.2 Fatalities
    - Added language to account for MEC's assumptions that fatalities are evenly distributed among turbines and that the most conservative fatality estimate is derived from a 35% reduction in fatalities of little brown bats.
  - Section 4.3.4.1.1.3 Summary of Fatality Impacts
    - Deleted statement about no range wide or regional population estimates currently available for little brown bat
    - Added Iowa population estimate from Russell et al. (2015); updated percent of the little brown bat population that would be taken annually (0.1% to 0.17%) based on Russell et al. (2015)'s estimate.
    - Added statement about percent of Iowa's little brown bat population that would be taken annually (0.15% to 0.25%) based on the population size estimate used in the MEC HCP.
    - Updated the overall little brown bat mortality rate to 13.75% to account for the new estimates based on updated population data.
    - Added clarifying statement that little brown bat take is minor.
    - Table 4.3-3: updated HCP Alternative numbers using MEC's assumptions and updated in numbers in text to reflect changes.
  - Section 4.3.4.2.2 Mitigation Effects
    - Deleted Table 4.3-6 and referenced Table 4.2-3 instead, which has the same information.
- Section 4.3.4.2 Tri-colored Bat
  - Section 4.3.4.2.1.2 Fatalities
    - Added language to account for MEC's assumptions that fatalities are evenly distributed among turbines and that the most conservative fatality estimate is derived from a 35% reduction in fatalities of tri-colored bats.
  - Section 4.3.4.2.1.3Summary of Fatality Impacts
    - Deleted statement that take of tri-colored bats under the alternatives would increase the adult mortality rate by 3.7%.
    - Table 4.3-4: updated HCP Alternative numbers using MEC's assumptions and updated in numbers in text to reflect changes.
  - Section 4.3.4.2.2 Mitigation Effects
    - Deleted Table 4.3-8 and referenced Table 4.2-3 instead, which has the same information.

- Section 4.4 Air Quality and Climate
  - Section 4.4.2 Operations Effects
    - Added clarification on greenhouse gas emissions not being from the wind farms themselves.
- Section 5.1.2 Wind Energy Development
  - Revised projected wind turbine development within the Eastern Tallgrass Prairie and Prairie Potholes Bird Conservation Regions over the 30-year permit term and projected bird fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.1-1), per public comments received
  - Addition of a statement about plans for the next phase of MEC's build-out, Wind XII, per public comments received
  - Table 5.1-1: Updated avian fatalities at non-covered turbines, total avian fatalities, and percent contribution due to the covered projects, in accordance with updated bird fatalities estimates.
  - Updated text throughout the section to reflect updates made to Table 5.1-1.
- Section 5.1.4 Climate Change

    - Updated estimated annual bird fatalities for the covered projects.
- Section 5.2.2.1 Mississippi River Flyway Eagle Management Unit
    - Revised projected wind turbine development within the Mississippi River Flyway Eagle Management Unit over the 30-year permit term and projected bald eagle fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.2-1), per public comments received
    - Edited average bald eagle fatality rate at MEC turbines to 0.005 bald eagle per turbine per year (formerly 0.006 bald eagle/turbine/year; changes in text and in Table 5.2-1), due to error in the DEIS
    - Omitted the two additional bald eagle fatalities, which were added to account for potential repowering of the Covered Projects beginning in 2020, from the cumulative effects calculation (in text and in Table 5.2-1). MEC has provided measures in the HCP to address changed circumstances and to ensure that permitted take is not exceeded at the Covered Projects. If take of bald eagles increases at the Covered Projects, MEC will follow the changed circumstances procedures in the HCP and pursue a permit amendment, as necessary
- Section 5.2.2.2 Local Area Population
    - Revised projected wind turbine development within the local area over the 30-year permit term and projected bald eagle fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.2-2), per public comments received
    - Edited average bald eagle fatality rate at MEC turbines to 0.005 bald eagle per turbine per year (formerly 0.006 bald eagle/turbine/year; changes in text and in Table 5.2-2), due to error in the DEIS
    - Omitted the two additional bald eagle fatalities, which were added to account for potential repowering of the Covered Projects beginning in 2020, from the cumulative effects calculation (in text and in Table 5.2-2). MEC has provided measures in the HCP to address changed circumstances and to ensure that permitted take is not exceeded at the Covered Projects. If take of bald eagles increases at the Covered Projects, MEC will follow the changed circumstances procedures in the HCP and pursue a permit amendment, if necessary
- Section 5.2.7 Geographic and Temporal Scale and Types of Impacts
    - Changed language to say Region 3 was chosen as the best available and most reasonable spatial scale for all bat species for which populations have not been delineated.
- Section 5.2.8 Wind Energy Development
    - Revised projected wind turbine development within the Service's Region 3 and within the OCRU over the 30-year permit term to the year 2049 (in text), per public comments received
    - Section 5.2.8.1 Bats Not Listed Under the ESA or Covered by the HCP
        - Revised projected wind turbine development within the Service's Region 3 over the 30-year permit term and projected non-listed and non-covered bat fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.3-1), per public comments received
        - Revised total bat mortality contribution percentages in Region 3, in accordance with the revised fatality estimates for wind energy build-out to the year 2049
        - Updated bat fatality estimate for the covered projects, as well as non-listed and non-covered bat fatalities by alternative; added clarification of fatality rates for non-covered bat species (in text and in Table 5.3-1)
        - Table 5.3-1: Updated bat fatalities at non-covered turbines, total bat fatalities, and percent contribution due to the covered projects, in accordance with the updated bat fatality estimates for the MEC projects.
        - Updated text throughout section to reflect updates made in Table 5.3-1.
        - Changed "total bat mortality" to "total potential bat mortality" because it is a projection.
        - Added clarifying statement that with current information, it is unknown whether tree bat populations can be sustained under wind development over the next 30 years; added statement that this analysis is under the assumption that turbines will be free-wheeling

and no conservation measures will be implemented at non-covered turbines but if conservation measures are implemented, that tree bat populations could be sustained under the projected wind development.
        - Added statement saying there is insufficient information at this time to estimate probable tree bat populations or the likelihood of implementation of AWEA guidelines across Region 3.
    - Section 5.2.8.2 Indiana Bat
        - Revised projected wind turbine development within the OCRU over the 30-year permit term and projected Indiana bat fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.3-2), per public comments received
        - Corrected number of wind turbines and associated Indiana bat fatalities to be added by Wind XI within the OCRU (Table 5.3-2)
        - Revised Indiana bat mortality contribution percentages in the OCRU, in accordance with the revised fatality estimates for wind energy build-out to the year 2049
    - Section 5.2.8.3 Northern Long-Eared Bat
        - Revised projected wind turbine development within the Service's Region 3 over the 30-year permit term and projected northern long-eared bat fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.3-3), per public comments received
        - Revised northern long-eared bat mortality contribution percentages in the Service's Region 3, in accordance with the revised fatality estimates for wind energy build-out to the year 2049
    - 5.2.8.4 Little Brown Bat
        - Revised projected wind turbine development within the Service's Region 3 over the 30-year permit term and projected little brown bat fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.3-4), per public comments received
        - Revised little brown bat mortality contribution percentages in the Service's Region 3, in accordance with the revised fatality estimates for wind energy build-out to the year 2049
    - 5.2.8.5 Tri-Colored Bat
        - Revised projected wind turbine development within the Service's Region 3 over the 30-year permit term and projected tri-colored bat fatalities to include wind energy build-out to the year 2049 (in text and in Table 5.3-5), per public comments received
        - Revised tri-colored bat mortality contribution percentages in the Service's Region 3, in accordance with the revised fatality estimates for wind energy build-out to the year 2049
- Section 5.2.9 White-Nose Syndrome
    - Updated the annual non-listed and non-covered bat fatality estimate for the covered projects under Alternative D, in accordance with the updated fatality rate.
- Section 5.2.10 Climate Change
    - Updated the annual non-listed and non-covered bat fatality estimate for the covered projects under Alternative D, in accordance with the updated fatality rate.
- Section 5.2.12 Summary of Cumulative Effects to Bats
    - Changed language from annual mortality "at a wind farm" to annual mortality "from wind energy facilities" in reference to the importance of the impact to cave-dwelling bats.
    - Changed paragraph four to refer to all covered species, not just the Indiana bat in the OCRU.
    - Deleted paragraph five to keep the summary about all bats, not specifically the Indiana bat. Details from the deleted paragraph can be found in Section 5.2.8.2.
- Section 5.3 Irreversible and Irretrievable Commitment of Resources
    - Table 5.4-1: Updated the estimated permit-term fatalities of non-listed birds and non-listed and non-covered bats in accordance with the updated fatality rates.
- Section 5.5 Identification of Preferred Alternative
    - Addition of this section
- Section 6.0 Consultation and Coordination with Others

    - Updated information on the public review period for the DEIS, including addition of information on the public meetings and reference to public comments received and responses
- Additions to Literature Cited (Appendix B)
    - Addition of references
        - Baumgartner, E., M. Kauffman, A. Hoeing, K. Bay, R. Tupling, and J. Sojka. 2018a. 2017-2018 Post-Construction Fatality Monitoring: Bat-Focused Surveys: MidAmerican Energy Company, Iowa Wind Energy Portfolio: Ida Grove and O'Brien, March 2017 – March 2018. Prepared for MidAmerican Energy Company, Urbandale, Iowa. Prepared by WEST, Cheyenne, Wyoming.
        - Baumgartner, E., K. Bay, J. Studyvin, and A. Hoeing. 2018b. 2017-2018 Post-Construction Fatality Monitoring: Eagle-Focused Surveys: MidAmerican Energy Company, Iowa Wind Energy Portfolio: Ida Grove and O'Brien Wind Energy Facilities, March 2017 – March 2018. Prepared for MidAmerican Energy Company, Urbandale, Iowa. Prepared by WEST, Cheyenne, Wyoming.
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        - BirdLife International 2019. Species factsheet: *Coturnicops noveboracensis*, Yellow Rail. http://datazone.birdlife.org/species/factsheet/yellow-rail-coturnicops-noveboracensis.
        - Boyles, J.G., P.M. Cryan, G.F. McCracken, and T.H. Kunz. 2011. Economic Importance of Bats in Agriculture. Science 332(6025):41-42.
        - Cleveland, C. J., M. Betke, P. Federico, J.D. Frank, T.G. Hallam, J. Horn, J.D. López, G.F. McCracken, R.A. Medellín, A. Moreno-Valdez, C.G. Sansone, J.K. Westbrook, T.H. and Kunz. 2006. Economic value of the pest control service provided by Brazilian free-tailed bats in south-central Texas. Frontiers in Ecology and the Environment 4:238-243.
        - Maine, J.J., and J.G. Boyles. 2015. Bats initiate vital agroecological interactions in corn. PNAS 112(40):12438-12443.
        - Russell, R., Thogmartin, W., Erickson, R., Szymanski, J., & Tinsley, K. (2015). Estimating the short-term recovery potential of little brown bats in the eastern United States in the face of White-nose syndrome. *Ecological Modelling*, *314*, 111-117. doi: 10.1016/j.ecolmodel.2015.07.016
        - USDA. 2018. Summary Report: 2015 National Resources Inventory. Natural Resources Conservation Service, Washington, D.C., and Center for Survey and Statistics and Methodology, Iowa State University, Ames, Iowa. September 2018.
    - Revisions to references
        - Bay et al. 2017b was revised to Bay et al. 2017c
        - Deletion of Birdlife International 2016a
        - Birdlife International 2016b was revised to Birdlife International 2016
- Additions to Acronyms (Appendix D)
    - FEIS – Final Environmental Impact Statement
    - ROD – Record of Decision