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**Habitat Conservation Plan for the Hine’s Emerald Dragonfly, Blanding’s Turtle, Spotted
Turtle, Leafy Prairie Clover, and Lakeside Daisy**

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Romeoville Area, Will County, Illinois

Submitted To:

U.S. Fish and Wildlife Service

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By:

Hanson Material Service

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February 3, 2021

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Habitat Conservation Plan for the Hine’s Emerald Dragonfly, Blanding’s Turtle, Spotted Turtle, Leafy Prairie Clover and Lakeside Daisy in support of the issuance of an Incidental Take Permit under the Endangered Species Act (16 USC §1531-1543) for the Hine’s emerald dragonfly and Blanding’s turtle and spotted turtle; and Incidental Take Authorization under the Illinois Endangered Species Protection Act (520 ILCS 10/) authorization for the Hine’s emerald dragonfly, Blanding’s turtle, and spotted turtle in Will County, Illinois.

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Title of Proposed Action: Habitat Conservation Plan for the issuance of an Endangered Species Act Incidental Take Permit and an Illinois Endangered Species Protection Act Incidental Take Authorization for incidental take of the Hine’s emerald dragonfly, Blanding’s turtle, and spotted turtle in association with legally authorized activities, Will County, Illinois¹.

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Federal Legal Mandate for Proposed Action: Endangered Species Act of 1973, as amended, 16 USC §1539(a)(1)(B) (“Section 10”), as implemented by 50 CFR 17.22 for endangered species.

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State Legal Mandate for Proposed Action: Illinois Endangered Species Protection Act (520 ILCS 10/5.5).

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EXECUTIVE SUMMARY

Hanson Aggregates Midwest, Inc. d/b/a Hanson Material Service (HMS) and its predecessor companies have been operating a limestone quarry on multiple properties in the vicinity of Romeoville in Will County, Illinois, for more than sixty years. The mining operations support approximately 85 employees. Most of the properties are located within the lower Des Plaines River Valley, which contains habitat for several threatened and endangered species. Under its current mining plan, HMS will run out of primary available surface limestone reserves in approximately 2026, threatening the facility's existence and employees' livelihoods, and will negatively impact the beneficiaries of the limestone resources, including the municipalities and other HMS clients and their projects. HMS therefore needs to expand its mining operations.

However, some of the land on which HMS must expand its mining operations contains habitat for endangered species. Therefore, in accordance with federal, state and local law, HMS will preserve, restore, enhance, and maintain over 500 acres of additional land which serves or will serve as habitat for the species. This action will not only make up for the impacts to the species from the mining activity but will also significantly contribute to the conservation of those species in the future. This Habitat Conservation Plan (HCP) sets forth the details of HMS' plan to do so.

Through this HCP, HMS can both meet its business needs and meaningfully contribute to the conservation of the Covered Species (defined below). Under this HCP, HMS' activities will impact 49.6 acres of adult Hine's emerald dragonfly (HED) habitat and may also result in taking up to 12 Blanding's turtles and two spotted turtles. To compensate for those impacts, HMS will enhance, restore and/or preserve 531 acres of Covered Species habitat near the impacted area, thus significantly contributing to the conservation of these species.

HMS' HCP represents the culmination of over 15 years of cooperation, planning and studies to develop a multi-species HCP for a portion of the lower Des Plaines River Valley. It has been carefully designed to respond to the long-term conservation needs of the Covered Species and their habitats, to accommodate the permit needs of HMS, and to monitor the plan's implementation and effectiveness over the life of the permit. This HCP has been developed to meet the Endangered Species Act (ESA) Section 10(a)(2)(A) requirements for a conservation plan that addresses Section 10(a)(2)(B) issuance criteria for an Incidental Take Permit (ITP) issued by the U.S. Fish & Wildlife Service (USFWS) and the requirement for a Title 17 IAC Section 1080 issuance of an Incidental Take Authorization from the Illinois Department of Natural Resources (IDNR).

Under this HCP, HMS is applying for a 30-year Incidental Take Permit (ITP) from the USFWS and a 30-year Incidental Take Authorization (ITA) from the IDNR for the Covered Species. This permit period allows the HCP to remain effective and provide adequate protection for the Covered Species during HMS' planned surface mining and related activities at its Romeoville facility, as well as activities during its sub-surface mining operations that may require an ITP or ITA. HMS plans to have regular meetings with the USFWS, IDNR and other stakeholders, as needed, throughout the life of the ITP and ITA to evaluate the success of and possible changes to the implementation of the HCP; to address any adaptive management considerations, potential

changed circumstances, or unforeseen circumstances; and to consider any other issues that may affect HMS' implementation of the HCP.

Species Included in the HCP

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The overriding biological goal of this HCP is to meaningfully contribute to the conservation of the federally and state-listed (threatened and endangered) species found in the Permit Area (geographic area where activities covered by the ITP and ITA occur) and Planning Area. This HCP addresses conservation measures for the following species (collectively referred to as "the Covered Species") in support of HMS' application for both an ITP and ITA:

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- Federal and Illinois endangered Hine's emerald dragonfly (*Somatochlora hineana*), and its critical habitat;
- Illinois endangered Blanding's turtle (*Emydoidea blandingii*);
- Illinois endangered spotted turtle (*Clemmys guttata*);
- Federal and Illinois endangered leafy prairie clover (*Dalea foliosa*); and
- Federal threatened and Illinois endangered Lakeside daisy (*Hymenoxys acaulis*).

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Covered Lands

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This HCP includes a Permit Area (2,072 acres) and a Planning Area (35,445 acres). The Permit Area is located within the lower Des Plaines River Valley and contains two federally designated critical habitat units (CHUs) for the HED (75 Fed. Reg. 21394-21453) and contains all areas where HMS' activities that may affect the Covered Species or their habitat (i.e. Covered Activities) occur. This area contains springs, seeps, wet prairies, marshes, and other wetland habitats currently used by the HED, Blanding's and spotted turtles, and leafy prairie clover (Lakeside daisy is found in the Planning Area but not in the Permit Area). The Permit Area also includes historic and potentially restorable habitat that may be used in the future by the Covered Species with the implementation of the mitigation measures included in this plan. HMS, along with Commonwealth Edison (ComEd), NRG Energy, and other private entities, owns and/or manages land located within the Permit Area.

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The Planning Area includes all HED habitat areas near the Permit Area and lands that have been determined to be important groundwater recharge areas for wetlands that provide habitat for the HED and other Covered Species located within CHUs 1, 2, and 7. All habitat areas for Covered Species (including CHUs) that might potentially be impacted by Covered Activities are also included in the Planning Area. The Planning Area is extensive, and includes portions of the Villages of Romeoville, Homer Glen, Lemont, Orland Park, and Cities of Crest Hill and Lockport.

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Covered Activities

In accordance with its Mining Plan, HMS first proposes to complete its current surface mining in Pierce Eich Quarry (35 acres), located west of Route 53, by approximately 2026. (See Figure 2 in Appendix A for the location of all HMS parcels.) When this mining is nearly complete, HMS proposes to resume surface mining in Middle Quarry (approximately 1 acre) and start surface

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mining in Middle Parcel. Mining of Middle Parcel will start at the south end (from Middle Quarry) and progress generally in a northerly direction. Mining will occur on approximately 115 acres of the 125-acre parcel and is estimated to take approximately 20 years. In addition, HMS proposes to surface mine 36 acres in East Parcel (immediately north of East Quarry) which will not require an ITP or ITA. In total, HMS proposes to surface mine 187 acres at the Romeoville facility over a period of 35 years, but a 30-year permit will cover all activities that require a permit.

In approximately 15 years and prior to completion of surface mining operations at the Romeoville facility, HMS will begin sub-surface mining operations at a depth of 350 feet below the surface at the facility. All sub-surface mining and support operation during the ITP period will occur on or under already developed or mined areas owned by HMS. In addition to the actual mining of limestone, other associated operations at the Romeoville facility will continue, such as crushing, washing, and sizing of limestone; truck, rail, and barge loading; and activities of support offices that are required for processing and shipping the limestone. In addition, HMS will retain a small setback area along the west side of North and Far North Parcels (350' back from Route 53) for future development. The setback area on North Parcel is 6.49 acres and Far North Parcel is 10.65 acres.

HMS also proposes to undertake various habitat restoration and management activities that will be covered by the permit. These activities will include, among other things, cutting and applying herbicide to invasive shrubs and trees, applying herbicide to invasive herbaceous species, seeding and planting native species, conducting prescribed burns, and discing or tilling soil in specific locations. In addition, an access road covering about 0.39 acres and a number of temporary routes will be constructed through ComEd Parcel and a small portion of Long Run Parcel for access during the wet dolomite prairie transplant and other restoration activities. The transplant will involve the removal of fill material from ComEd Parcel and placement of wet-mesic dolomite prairie sod (6.01 acres) salvaged from Middle Parcel into the ComEd Parcel.

Potential Biological Impacts, Avoidance and Minimization Measures, and Mitigation

Hine's Emerald Dragonfly

The first recorded occurrence of the HED in Illinois was a collection from 1983 that was not confirmed until 1987. The HED was listed as state endangered in Illinois in 1991, listed as federally endangered in January 1995, and a Recovery Plan was published in September 2001. Critical Habitat was designated for the HED in September 2007 and revised in April 2010. After the HED was listed, and before the Recovery Plan was even published, HMS began meeting with local, state and federal agencies to confer about its continued mining operations in the area and how the company could ensure both the viability of its business as well as the viability of the HED in the area. Thus began a truly cooperative industry/agency undertaking.

The principal threat to the HED in Illinois is habitat degradation and alteration. HED larvae are restricted to wetland habitats (e.g. marshes, seeps and sedge meadow) with thin soils over limestone bedrock. Adult HED use these same wetlands as well as adjacent open uplands, such as meadows and old fields. This degradation and alteration include direct loss of habitat, such as filling of wetlands, as well as possible indirect alterations of habitat, such as changes in surface

and sub-surface hydrology. Alteration of hydrologic regimes in the Planning Area might adversely affect the larval and breeding habitat of the species by changing water temperature, flow, chemistry, and volume. Quarries, road construction, municipal and private wells, addition of impervious surfaces, and alteration of surface drainage patterns could all cause reductions in the suitability of habitat or the outright loss of suitable larval and breeding habitat.

Transportation and roadways are also a threat to the dragonfly, both from direct mortality (i.e., hitting) and habitat destruction or fragmentation. Land use practices, fire suppression, and agricultural development have also reduced available habitat as well as the abundance of insects for prey across the dragonfly's range.

Under this HCP, HMS will avoid impacts to the HED by not surface mining certain parcels it owns, and instead will preserve those parcels through a Declaration of Covenants, Conditions, and Restrictions (that will be converted to a conservation easement if a qualified entity is found to hold it). These parcels include River South, Fitzpatrick Seep, River South Bluff, River, North, Far North, River North, ComEd, and Long Run for a total of 530.9 acres, of which 518.9 will be permanently protected.

No direct take of the adult HED is anticipated to occur during mining operations in Middle Parcel because all stripping (removal of overburden) will be conducted, as much as possible, outside the adult HED flying season (May 15 to October 15). If overburden removal is conducted during flying season all vehicles will travel at low speeds (i.e., < 15 mph). In addition, actual mining will follow overburden removal and will occur at least 150 feet away from remaining adult HED habitat. No take of larvae is anticipated because recent studies have found no evidence of successful breeding or appropriate larval habitat conditions on the parcel.

HMS also plans to implement a number of measures to avoid potential impacts its surface mining may have on the contribution of groundwater to the habitat of the HED and other Covered Species. Measures to avoid potential groundwater related impacts include: 1) supplementation of shallow groundwater in River South Bluff Parcel and 2) enhancement of surface water infiltration on the Forest Preserve District of Will County (FPDWC) property in the southwest corner of Route 53 and Renwick Road. In addition, dewatering in the Pierce Eich Quarry will end after surface mining in that parcel is complete. Natural inundation of this area will occur and provide a long-term avoidance measure for potential groundwater impacts.

Surface mining of Middle Parcel will, however, result in the loss of 40.81 acres of adult HED foraging and dispersal habitat (but no larval habitat). All but about 6.5 acres of this habitat is low quality habitat dominated by *Phragmites* and old field vegetation. The development of the setback areas at the west end of North and Far North parcels will also result in the loss of 8.40 acres of adult HED habitat in total (also low quality old filed vegetation), and construction of an access route in Long Run and ComEd Parcels is expected to result in an impact to 0.39 acres of adult HED habitat. Thus, a total of 49.60 acres of adult HED habitat is expected to be impacted by HMS activities in the Permit Area. This represents a loss of only 3.3% of the known adult HED habitat (49.60 ac/1526 ac) within the CHUs in Illinois. There is additional HED habitat in Illinois beyond the CHUs.

To mitigate for the loss of this habitat, HMS plans to restore and enhance habitat on eight of its parcels: ComEd, Long Run, Fitzpatrick Seep, River South, River, North, Far North, and River North Parcels. In total, HMS will restore 182.2 acres, enhance 139.2, and maintain 32.5 acres of adult HED habitat on 518.9 acres of permanently protected land. As a result, this plan will permanently protect 17.9% of all HED Critical Habitat in Illinois and, through habitat restoration, will increase known adult HED habitat in the Lower Des Plaines River Valley of Illinois by 11.9%.

Blanding's & Spotted Turtles

The Blanding's turtle was listed in Illinois as a state threatened species in 1999 and was changed to state endangered in 2009. In addition, Blanding's turtle was petitioned in 2012 for federal listing, and a 90-day "substantial" finding was published by USFWS on July 1, 2015, indicating that listing may be warranted for the Blanding's turtle (after further review). The greatest threats to the species are loss and fragmentation of both wetland and nesting habitat, predation, collecting, and automobile strikes. The Blanding's turtle has been found recently in a number of parcels throughout the Planning Area including Lockport Prairie Nature Preserve (LPNP), Romeoville Prairie Nature Preserve (RPNP), HMS' Middle, North, Far North and River North Parcels and the adjacent ComEd Rights-of-Ways, and HMS' Long Run and ComEd Parcels.

The spotted turtle is a state endangered species which also was petitioned in 2012 for federal listing and received a 90-day "substantial" finding by USFWS on July 1, 2015, indicating that listing may be warranted for the spotted turtle (after further review). The species' greatest threats are habitat loss and fragmentation due to invasive species, changes in hydrology, urban development, and collection for the pet trade industry. Within the Planning Area, the spotted turtle is known to occur in LPNP and RPNP.

Since HMS is mining almost all of Middle Parcel, it is estimated to impact all of the potential Blanding's turtle and spotted turtle habitat (29.14 acres) on the parcel. Little direct take (mortality) of either covered turtle species is anticipated to occur during mining operations in Middle Parcel because a number of avoidance and minimization measures (AMMs) will be implemented before and during mining operations to prevent the take of the turtle species. Blanding's turtle is known to occur on ComEd and Long Run Parcels, and the same AMMs will be used in these parcels during mitigation activities. However, an access road will be installed on the southern boundary of ComEd parcel impacting 0.39 acres of potential Blanding's and spotted turtle habitat. Therefore, the total habitat impact for the Covered turtles is 29.53 acres. Based on the documented occurrences of Blanding's turtle in the Permit Area, take is conservatively requested for a total of 12 individuals of this species. This level of take is not expected to have a significant effect on the regional population. Because spotted turtles are not believed to be present on any HMS' property, proposed activities would have no impact on the species. However, as a precaution, take is requested for a total of two spotted turtles. This is not expected to have a significant effect on the Illinois population. Furthermore, both turtle species will benefit from the mitigation measures (i.e. habitat restoration) described above.

Leafy Prairie Clover

The leafy prairie clover (LPC) was listed as federally endangered in 1991. The species is listed as endangered in Illinois. Threats to the LPC include habitat loss, competing invasive species,

5 shade suppression by woody species, and fire suppression. LPC is known to occur on several parcels in the Planning Area, including: LPNP, RPNP, ComEd Parcel, Long Run Parcel, Lockport Prairie East, and Dellwood Park West Nature Preserve. With the implementation of avoidance measures, HMS anticipates very little (less than five individual plants) to no take of LPC plants.

Lakeside Daisy

10 The Lakeside daisy was listed as federally threatened in 1988. The species is listed as endangered in Illinois. The two known Lakeside daisy sites in Will County are located in LPNP and RPNP. No impact is anticipated for the Lakeside daisy.

Other Key Elements of the HCP

15 The HCP also includes a monitoring and reporting section, the goal of which is to provide a reliable basis for documenting compliance with and effectiveness of the HCP and ITP throughout the permit term. HMS’ monitoring and reporting program will (1) document implementation of and compliance with AMMs and mitigation measures; (2) document both the anticipated and actual take of Covered Species (whether through individuals or surrogates); (3) evaluate the effectiveness of the conservation program; (4) assess the need for responses to
20 changed circumstances or adaptive management; (5) document the implementation and effectiveness of any measures undertaken to respond to changed circumstances or adaptive management measures; and (6) explain how implementation, including funding, continues to be assured.

25 Adaptive management is a process by which management practices are incrementally improved through implementation of plans that provide opportunities to learn from experience. This HCP includes an adaptive management program designed to gauge the effectiveness of the conservation program and to propose alternative or modified management measures in response to the monitoring results. As new information from monitoring, research (by others), or day-to-
30 day management becomes available, the information will be evaluated in the context of this HCP’s goals and objectives.

The HCP also includes “No Surprises” assurances, addresses changed and unforeseen circumstances, implementation costs, funding assurances, and an analysis of alternatives.

35

1.0 INTRODUCTION and BACKGROUND

5 This Habitat Conservation Plan (HCP) has been developed to meet the Endangered Species Act (ESA) Section 10(a)(2)(A) requirements for a conservation plan that addresses Section 10(a)(2)(B) issuance criteria for an Incidental Take Permit (ITP) (16 USC §1539 (a)(2)(A) and (B)). This HCP is designed to accommodate the permit needs of Hanson Aggregates Midwest, Inc. d/b/a Hanson Material Service (HMS), respond to the long-term conservation needs of the Covered Species (defined below) and their habitats, and monitor the plan’s implementation effectiveness. HMS is applying for a 30-year ITP from the U.S. Fish & Wildlife Service (USFWS) and a 30-year
10 Incidental Take Authorization (ITA) from the Illinois Department of Natural Resources (IDNR) (520 ILCS 10/5.5(a) and (b)). A permit period of 30 years is needed to cover the expected duration of HMS’ surface mining operations at its Romeoville facility that require an ITP and ITA (Figures 1 and 2, Appendix A).

15 This document represents the culmination of over 15 years of cooperation, planning and studies by industry and the agencies to develop a multi-species HCP for a portion of the lower Des Plaines River Valley. The overriding biological goal of this HCP is to meaningfully contribute to the conservation of the federally and state-listed (threatened and endangered) species found in the Permit Area and Planning Area. The Permit Area is the geographic area where activities that are likely to negatively affect the Covered Species (i.e. Covered Activities) occur. Covered Activities are covered by the ITP and ITA. The Planning Area includes the Permit Area and nearby HED
20 habitat areas (including all those that potentially could be impacted by Covered Activities) and estimated groundwater recharge areas for HED larval habitat within and adjacent to the Permit Area as shown on Figure 2 and 3, respectively, in Appendix A. This HCP addresses conservation
25 measures for the following species (collectively referred to as the Covered Species) in support of HMS’ application for both an ITP and ITA:

- Federal and Illinois endangered Hine’s emerald dragonfly (*Somatochlora hineana*) (“HED,”) and its critical habitat;
- 30 • Illinois endangered Blanding’s turtle¹ (*Emydoidea blandingii*);
- Illinois endangered spotted turtle¹ (*Clemmys guttata*);
- Federal and Illinois endangered leafy prairie clover (*Dalea foliosa*); and
- Federal threatened and Illinois endangered Lakeside daisy (*Hymenoxys acaulis*).

35 If other state or federally listed species are found in the Planning Area and could be affected by HMS’ activities, HMS will amend the HCP and apply for an incidental take permit or authorization as appropriate and needed.

1.1 Purpose and Need

40 The purpose of this HCP is to evaluate the impacts of HMS’ proposed activities on the Covered Species listed in Section 1.0 and their habitats (including federally designated Critical Habitat Units (CHUs) for the HED) and to propose measures for avoiding, minimizing, or mitigating for potential incidental take of these species and their habitats. This HCP document does not include an
45 Environmental Assessment (EA) and is not intended to meet the requirements of the National

¹ Federal ITP will be sought for Blandings and Spotted turtle because both were petitioned for federal listing in 2012.

Environmental Policy Act (NEPA) for the USFWS. A separate NEPA document has been prepared by USFWS.

5 HMS and its predecessor companies have been operating a limestone quarry on multiple properties in the vicinity of Romeoville in Will County, Illinois, for more than sixty years. The mining operation supports approximately 85 employees. HMS owns several properties within the Permit Area totaling 1,437 acres (Figure 2, Appendix A). HMS is projected to run out of available surface limestone reserves in 2026, which seriously threatens the facility’s existence and employees’
10 livelihoods, and will negatively impact the beneficiaries of the limestone resources, including the municipalities, local and state transportation agencies, and other customers of HMS products and their projects. HMS therefore needs to expand its mining operations. HMS’ mining plans are described in more detail in Section 3.0 and in Appendix E. Through this HCP, HMS will meet the needs of the Covered Species as well as its own business needs. The need for the HCP is to
15 authorize, pursuant to the ESA and HRS Chapter 195D, the take of threatened or endangered species (or species under consideration for listing) incidental to mining limestone. In order to obtain such authorization, HMS developed this HCP that meets the USFWS and IDNR issuance criteria for an ITP and ITA.

20 1.2 History of the HCP

HMS and two other businesses operating in the same area, Midwest Generation (MWGen) (now owned by NRG Energy) and Commonwealth Edison (ComEd), along with regulatory agencies created a “Right of Way Management Team” (“ROWMT”) in 1996 to address issues related to their operations in the Romeoville area, including HED maintenance. In September 2005, the IDNR
25 submitted a Grant Proposal to USFWS for funds to study the HED, which funds were given, along with significant funds from HMS (then MSC). The three businesses initiated a habitat conservation planning process in 2006 shortly after the grant was awarded. They initially came together as “Lead Partners” to develop a joint HCP document to address HED conservation and land use needs. Over a period of several years, the lead partners also engaged a number of additional public and private
30 landowners (referred to as Supporting Partners) in the development of a plan including: Chicago-Romeoville Airport, Forest Preserve District of Will County (FPDWC), Lockport Township Park District, Lewis University, Village of Romeoville, Village of Homer Glen, City of Lockport, and Village of Lemont (Figure 3, Appendix A). Due to business and timing issues, the original Lead Partners eventually decided to address their HCP needs separately. ComEd opted to prepare a low-effect HCP, which it submitted to USFWS in December 2013. A permit was then issued to ComEd
35 by USFWS on June 1, 2014 (USFWS permit #TE 28464B-0).

Many contributors have shared years of research and data and have helped develop the technical understanding that has served as the foundation for this HCP. As with most rare species, the
40 scientific understanding of the biology and ecology of the species included in this HCP may change over time. Consequently, this HCP includes adaptive management and was designed, to the extent possible, to allow for the inclusion of new information as it becomes available.

The area of land that is subject to this HCP has been divided into two areas:

- 45
- Permit Area (approximately 2,072 acres): this is the geographic area in which activities that are likely to negatively affect Covered Species (i.e. Covered Activities) will occur (Figure 2, Appendix A). The Permit Area includes all mining and other above-ground mining activities

in HMS' Romeoville facility and all mitigation, avoidance, and minimization measure areas owned by HMS. Although HMS does not own all the land within the Permit Area, all of HMS' Covered Activities as well as the mitigation, avoidance, and minimization measures that will occur within the Permit Area will take place only on land owned by HMS. One avoidance measure takes place outside the Permit Area but within the Planning Area and is described below.

- Planning Area (approximately 35,445 acres): this is the geographic area which includes the Permit Area as well as other nearby HED habitat areas (including all those that potentially could be impacted by Covered Activities), and estimated groundwater recharge areas for HED larval habitat within and adjacent to the Permit Area (i.e. Lockport Prairie, River South, ComEd, and Long Run Parcels) (Figure 3, Appendix A). An avoidance measure, located on property not owned by HMS (i.e. FPDWC infiltration pond), is also found within the Planning Area adjacent to the southwest corner of the Permit Area.

1.3 HCP Planning Process

During the HCP planning process, HMS conducted critical reviews of the known and possible stresses on each of the species and their known or potential habitat found on land which HMS owns, manages, or on which it conducts business. During this process, HMS coordinated with the USFWS, U.S. Army Corps of Engineers (USACE), and the IDNR, who provided guidance to ensure compliance with the requirements of federal and state regulations, laws, and procedures. Information was also shared with experts (e.g. hydrologists and biologists) to ensure sound analyses and conclusions.

The HCP planning process followed a multi-step approach that served as a decision-making tool. This process can be condensed into the following key steps:

1. Evaluation of stresses affecting the Covered Species and their habitats under existing land uses and proposed activities by HMS.
2. Incidental-take analysis for alternative scenarios.
3. Creation of plans to avoid, minimize, and mitigate for stress and/or incidental take under existing and proposed activities.
4. Development of an HCP to allow business activities on the land to continue and to allow HMS to enter into binding agreements with the U.S. Fish and Wildlife Service (USFWS) and Illinois Department of Natural Resources (IDNR) on incidental-take issues.

This plan also brought together many partners, including those that own land, regulate land use, and use land through conveyed easements. HMS worked with ComEd, MWGen, and USFWS to recruit a comprehensive group of supporting partners over the years. Figure 3 in Appendix A identifies HMS properties as well as land ownership by all the recruited partners. While actively engaged partners in this HCP own or manage most of the land within the Planning Area, other lands and activities within this area that could affect the Covered Species and their habitat are beyond the control of the HCP partners. The following entities agreed to be partners in the HCP process and were active in the early development of this conservation plan (also see Appendix D):

- ComEd
- Midwest Generation (now owned by NRG Energy)
- Chicago-Romeoville Airport

- Forest Preserve District of Will County
- Village of Homer Glen
- Village of Lemont
- Lewis University
- 5 • City of Lockport
- Lockport Township Park District
- Village of Romeoville

10 Detailed Recovery Plans have been prepared by USFWS for the HED, leafy prairie clover, and Lakeside daisy (USFWS 2001; USFWS 1990; USFWS 1996). There are no Recovery Plans for the Blanding’s turtle or the spotted turtle in Illinois, but significant research on their local populations and ecology, along with recovery efforts elsewhere, have been used to help determine the conservation needs for these species in this HCP. The Planning Area represents the western-most extent of the range of the spotted turtle in North America and is the only location where it co-occurs
15 with the Blanding’s turtle in Illinois (Harding 1997; pers. comm. with B. Semel, IDNR 2010). In the absence of recovery plans, guidance from researchers (M. Dreslik and D. Mauger) with local knowledge and experience with the turtles’ ecologies has played a crucial role in conservation planning for these species in this HCP. The commitments made in this HCP positively contribute to the recovery goals for all the Covered Species.

20

1.4 Biological Goals and Objectives of the HCP

Section 10(a)(2)(A) of the ESA requires that an HCP specify the measures that the permittee will take to minimize and mitigate to the maximum extent practicable the impacts of the taking of any
25 federally listed animal species as a result of activities addressed by the HCP.

As part of the USFWS Five Point Policy set forth in the 2000 Addendum to the HCP Handbook, HCPs must establish biological goals and objectives (65 Fed. Reg. 35242, June 1, 2000). According to the 2016 HCP Handbook, biological goals serve as the foundation of the conservation strategy
30 and should be used to guide how the plan is developed and implemented, and the objectives are the specific steps to achieve the goals (USFWS and NMFS, 2016). The purpose of the biological goals is to ensure that the operating conservation program in the HCP is consistent with the conservation and recovery goals established for the species. Recovery Plan goals for each species are discussed in Section 2.2. Thus, this HCP must be consistent with recovery goals, but is not required to result
35 in the recovery of an ESA-listed species.

The biological goals for this HCP are:

- To meaningfully contribute to the conservation of the Covered Species found in the Permit and Planning Area;
- Protect Covered Species and habitat by avoiding and minimizing take of Covered Species and impacts to their habitat to the maximum extent practicable; and
- To restore, enhance, and preserve Covered Species habitat as mitigation for impacts to habitat.

45

The following definitions for “avoidance,” “minimization,” and “mitigation” were agreed upon by HMS and USFWS and apply throughout this document:

Avoidance: Avoid the impact altogether to a resource (e.g. Covered Species or its habitat) from an activity. This could be done by not taking the action or parts of the action that could cause the impact or putting in place measures to prevent the impact of the activity.

Minimization: Reduce the impact to a resource (e.g. Covered Species or its habitat) from an activity. This could be done by limiting the degree or magnitude of the action that causes the impact or putting in place measures to limit the impact of the activity.

Mitigation: Compensate for the impact to a resource (e.g. Covered Species or its habitat) from an activity. This can be done by repairing, rehabilitating, or restoring the affected environment (e.g. habitat), or replacing or providing substitute resources or environments (e.g. species or habitat). This includes restoration (and enhancement) of habitat as well as preservation of habitat without restoration.

The biological objectives that will be implemented to achieve these goals are listed below. Specifics about the actions taken to meet these goals and measurable outcomes (e.g. performance standards) to determine if goals have been achieved are found in the sections referenced below and in this Chapter 6. A description of how these actions will address the recovery criteria for the HED is found in Section 5.1.2.

- Implement avoidance and minimization measures to prevent take of Covered Species and impact to their habitat, including, impacts to groundwater (see Section 5.1.3, 5.2.3, and 5.3.3);
- Restore potential habitat and enhance existing Covered Species habitat (see Section 5.1.7);
- Restore disturbed areas post-construction to pre-construction conditions (see Section 5.1.3, 5.2.3, and 5.3.3);
- Protect restored and enhanced habitat areas (see Section 5.1.7);
- Control erosion and sedimentation from planned work (where appropriate) (see Section 5.1.3 and 5.2.3);
- Work cooperatively with adjacent landowners and regulatory agencies; and
- Implement a monitoring program to track the progress of avoidance, minimization, and mitigation measures (AMMs) (see Sections 6.2.3, 6.2.4, and 6.2.5).

1.5 Regulatory and Legal Framework for Plan

This HCP serves as the basis for USFWS and IDNR decisions regarding the issuance of an Incidental Take Permit under Section 10 of the federal ESA (16 USC §1539(a)(1)(B)) and issuance of an Incidental Take Authorization under the Illinois Endangered Species Protection Act (IESA) (520 ILCS 10/5/5), respectively. This HCP may also be used by the USFWS and IDNR as a resource in connection with their required agency action consultations under the ESA and Illinois Natural Areas Preservation Act (see below).

Section 9 of the ESA prohibits the “take” of threatened or endangered species (16 USC §1538), with “take” defined as “the attempt or action to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect” such species (16 USC §1532(19)). However, Section 10 authorizes the issuance of a permit by USFWS for take that may occur incidentally to otherwise lawful activities with the submittal of an HCP (16 USC §1539(a)(1)(B) and (a)(2)(A)). An HCP must include the required description of effects of the anticipated take on affected species and habitat, and the measures proposed to avoid, minimize, and mitigate resulting impacts (see Chapter 5). The requirements of a

conservation plan and issuance of a permit under federal ESA Section 10 are included in this HCP and are described in Sections 1.5.1 below.

5 The Illinois Endangered Species Protection Act (IESPA) contains a provision similar to Section 9 of the federal ESA which makes it unlawful to take a (state-listed) threatened or endangered species (520 ILCS 10/3). “Take,” in reference to animals and animal products, is defined as “to harm, hunt, shoot, pursue, lure, wound, kill, destroy, harass, gig, spear, ensnare, trap, capture, collect, or to attempt to engage in such conduct (520 ILCS 10/2).” “Take,” in reference to plants and plant products, is defined as “to collect, pick, cut, dig up, kill, destroy, bury, crush, or harm in any manner.” (Id.) However, like Section 10 of the ESA, the IESPA provides a mechanism for
10 authorizing take that occurs incidental to an otherwise lawful activity (520 ILCS 10/5.5(a)). This “Incidental Take Authorization” is issued under prescribed terms and conditions, as described below in Section 1.5.2.

15 **1.5.1 Federal Endangered Species Act**

The ESA and its implementing regulations prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval under Section 10, as noted. The
20 ESA defines “take” as “to harass, *harm*, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” (16 USC §1532(19) Federal regulations implementing the ESA further define the term “harm” in the “take” definition to mean any act that actually kills or injures a federally listed species, including significant habitat modification or degradation (50 CFR 17.3).

25 Section 10 - Section 10 of the ESA establishes a process for obtaining an ITP, which authorizes non-federal entities to incidentally take federally listed wildlife or fish subject to certain conditions. “Incidental take” is defined by ESA as take that is “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.” (16 USC §1539(a)(1)(B)) Preparation of a
30 conservation plan, generally referred to as an HCP, is required for all Section 10(a) permit applications. The USFWS and the National Marine Fisheries Service (NMFS) have joint authority under the ESA for administering the incidental take program. NMFS has jurisdiction over anadromous fish species, and USFWS has jurisdiction over all other fish and wildlife species in the United States.

35 Section 7 - Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is “not likely to jeopardize the continued existence” of any endangered or threatened species listed under the ESA or result in the destruction or adverse modification of its critical habitat. (16 USC §1536(a)(2)) In this case, USFWS must engage both in intra-agency
40 consultation (for issuance of the ITP) and inter-agency consultation with the United States Army Corps of Engineers (USACOE) because HMS also seeks a permit under §404 of the federal Clean Water Act in connection with its activities. (33 USC §1344) The internal consultation is performed after an HCP is developed by a non-federal entity (e.g. HMS) and submitted for formal processing and review. Provisions of Sections 7 and 10 of the ESA are similar, but Section 7 requires
45 consideration of several factors not explicitly required by Section 10. Specifically, Section 7 requires consideration of the indirect effects of a project, effects on federally listed plants, and effects on critical habitat (the ESA requires that USFWS identify critical habitat to the maximum extent that is prudent and determinable when a species is listed as threatened or endangered). (16 USC §1536(a)(2)) Under the regulations implementing Section 7, the internal consultation is to result in a Biological Opinion prepared by the USFWS regarding whether implementation of the

HCP, as well as issuance of the §404 permit, will result in jeopardy to any listed species or will adversely modify critical habitat. (50 CFR §402.14(g) and (h))

Section 10 Process

5 The Section 10 process for obtaining an ITP has three primary phases: (1) the HCP development phase; (2) the formal permit processing phase; and (3) the post-issuance phase.

10 During the HCP development phase, the project applicant prepares a plan that integrates the proposed project or activity with the protection of listed species. According to Section 10 (a)(2)(A), an HCP submitted in support of an ITP application must specify:

“(i) the impact which will likely result from such taking;

15 *(ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps;*

(iii) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and

20 *(iv) such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan.”*

16 USC 1539(a)(2)(A)

25 The HCP development phase concludes, and the permit processing phase begins, when a complete application package is submitted to the appropriate permit issuing office. A complete application package for an HCP consists of an HCP, a permit application, a fee from the applicant, and a draft NEPA analysis and document. The USFWS must also publish a Notice of Receipt of a Permit Application in the Federal Register; prepare a Section 7 Biological Opinion; prepare a Set of Findings, which evaluates the Section 10(a)(1)(B) permit application in the context of permit
30 issuance criteria (see below); and prepare a document in compliance with the National Environmental Policy Act (NEPA) requirements. A Section 10 ITP is granted upon a determination by USFWS that all requirements for permit issuance have been met. Section 10 (a)(2)(B) specifies the following criteria for issuance of the ITP:

35 *(i) the taking will be incidental;*

(ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;

40 *(iii) the applicant will ensure that adequate funding for the plan will be provided;*

(iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and

45 *(v) the measures, if any, required under subparagraph (A) (iv) will be met.*

16 USC 1539(a)(2)(B)

If, after an opportunity for public comment, the USFWS finds that the criteria for issuance of the ITP have been met, the permit shall be issued. The ITP shall contain such terms and conditions as
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USFWS deems necessary or appropriate to determine compliance, including, but not limited to, reporting requirements (Id.).

5 During the post-issuance phase, the permittee implements the HCP and the USFWS monitors compliance and the long-term progress and success of the HCP. The public is notified of permit issuance by means of the Federal Register.

1.5.2 Illinois Endangered Species Protection Act (IESPA)

10 The IESPA states that it is unlawful for any person:

1. *To possess, take, transport, sell, offer for sale, give or otherwise dispose of any animal or the product thereof of any animal species which occurs on the Illinois List [a list of species of animals and plants listed by the Endangered Species Protection Board as endangered or threatened];*
 - 15 2. *To deliver, receive, carry, transport or ship in interstate or foreign commerce plants listed as endangered by the federal government without a permit therefore issued by the Department as provided in Section 4 of this Act;*
 3. *To take plants on the Illinois List without the express written permission of the landowner;*
 - 20 *or*
 4. *To sell or offer for sale plants or plant products of endangered species on the Illinois List.*
- 520 ILCS 10/3

25 However, the Illinois Department of Natural Resources (IDNR) may authorize, under prescribed terms and conditions, any taking otherwise prohibited if that taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. No taking under that section may be authorized unless the applicant submits a Conservation Plan. (520 ILCS 10/5.5)

30 The Conservation Plan submitted by the applicant must include the following: (Item 5 is not applicable to this HCP because the USFWS is not requiring an implementing agreement.)

1. *A description of the impact that the proposed taking is likely to have on one or more species on the Illinois list;*
2. *The steps the applicant or other parties will take to minimize and mitigate that impact and the funding that will be available to implement those steps, including but not limited to*
- 35 *bonds, insurance, or escrow;*
3. *What alternative actions to the taking the applicant considered and the reasons why those alternatives will not be used;*
4. *Data and information to assure that the proposed taking will not reduce the likelihood of the survival or recovery of the endangered species or threatened species in the wild within the*
- 40 *State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species' existence in Illinois;*
5. *An implementing agreement that specifically names and describes the obligations and responsibilities of all the parties that will be involved in the taking as authorized by the permit; and*
- 45 6. *Any other measures that the IDNR may require as being necessary or appropriate for purposes of the plan.*

520 ILCS 10/5.5(b)

The IDNR may authorize the incidental taking if it finds that the taking will meet all of the following requirements:

1. *The taking will not be the purpose of, but will be only incidental to, the carrying out of an otherwise lawful activity;*
2. *The parties to the conservation plan will, to the maximum extent practicable, minimize and mitigate the impact caused by the taking;*
3. *The parties to the conservation plan will ensure that adequate funding for the conservation plan will be provided;*
4. *Based on the best available scientific data, the IDNR has determined that the taking will not reduce the likelihood of the survival or recovery of the endangered species or threatened species in the wild within the State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species' existence in Illinois;*
5. *Any measures required under paragraph (6) of subsection (b) [necessary or appropriate] will be performed; and*
6. *The public has received notice of the application and has had the opportunity to comment before the IDNR has made any decision regarding the application.*

520 ILCS 10/5.5(c)

If an applicant is party to an HCP approved by the USFWS pursuant to Section 10 of the ESA, the IDNR may authorize taking that is incidental to the carrying out of an otherwise lawful activity (520 ILCS 10/5.5(f)). Authorization shall be issued only if the provisions of the HCP are found to meet the requirements of 520 ILCS 10/3 (Id.). Compliance with the state Conservation Plan requirements is discussed in Appendix I.

1.5.3 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (42 USC §4312 *et seq.*) requires that federal agencies analyze the environmental impacts of their actions (in this instance, issuance of an ITP) and include public participation in the planning and implementation of their actions. Under the NEPA regulations (implemented by the Council on Environmental Quality) compliance is obtained through one of three actions:

1. Preparation of an Environmental Impact Statement (generally prepared for high-effect HCPs);
2. Preparation of an Environmental Assessment (generally prepared for moderate effect HCPs); or
3. Preparation of a categorical exclusion (allowed for low-effect HCPs).

40 CFR §1501

The NEPA process helps federal agencies make informed decisions with respect to the environmental consequences of their actions and ensures that measures to protect, restore and enhance the environment are included, as necessary, as a component of their actions. Since the proposed avoidance, minimization, and mitigation measures set forth in this HCP will result in little or no impact to listed species, USFWS is preparing an Environmental Assessment (EA) for this HCP consistent with the law in this area.

1.5.4 Illinois Natural Areas Preservation Act

A separate protection system exists in Illinois under the authority of the Illinois Natural Areas Preservation Act (NAPA) (525 ILCS 30) for areas with a nature preserve designation. The NAPA penalizes any person who “willfully kills, injures, disturbs or removes any animal or plant or willfully damages, destroys or removes any object, or attempts to do any of the preceding, on a dedicated area (525 ILCS 30.23).” There are five protected nature preserve areas within the Planning Area:

- Lockport Prairie (FPDWC)
- Romeoville Prairie (FPDWC)
- Long Run Seep (IDNR)
- Dellwood Park West (Lockport Township Park District (LTPD))
- O’Hara Woods (Village of Romeoville)

The five nature preserves are owned by FPDWC, IDNR, LTPD, or the Village of Romeoville. This HCP is not intended to cover any *activities* on the protected nature preserves, but some concern has been expressed about possible groundwater impacts to some of the preserves. While the NAPA does not contain an incidental take provision similar to the federal and state endangered species acts, the statute does contain a “consultation” provision. Section 17 of the NAPA says, *inter alia*, that “each agency of State or local government must evaluate, through a process of consultation with the Department, whether actions... authorized, funded, or carried out by the agency of State or local government are likely to result in the destruction or adverse modification of any natural area.” 525 ILCS 30/17 Under Section 17, if the proposed action is found likely to have an adverse impact on a natural area, the agency shall study the proposed action to determine possible methods of eliminating or mitigating the adverse impact. HMS has been working with IDNR and the Nature Preserves Commission during the HCP planning process to ensure that no planned activities conflict with the NAPA. This coordination has focused on avoiding possible groundwater impacts to Lockport Prairie. In addition, HMS will continue to consult with the INPC in case any special use permits are required for management activities or other authorized activities.

1.5.5 Clean Water Act Permits

When an applicant applies for a dredge and fill permit under Section 404 of the federal Clean Water Act (33 U.S.C. §1344), the U.S. Army Corps of Engineers (USACE) must notify the USFWS of the application if there are listed or proposed listed species in the “action area” (that is, “all areas to be affected directly or indirectly by the Federal action...”) (50 C.F.R Sec. 402.02). The HED and the turtles covered by this HCP are dependent upon wetlands. While HMS does not intend to “dredge or fill” wetlands during its mining activities (it intends to remove overburden), the law in this area has been inconsistently interpreted over the last several years and, as such, is ambiguous. Therefore, since HMS’ proposed activity will impact wetlands, to be conservative, the company submitted a Section 404 permit application to both the USACE and the IEPA (which must issue a water quality certification under Section 401 of the CWA) on January 31, 2019. HMS has addressed the public comments it received on its Section 404 permit application and has revised its application in response to the Request for Additional Information letter it received from the USACE dated April 29, 2020. This HCP will also serve as the basis for decisions from those agencies. The company’s Section 404 permit application includes a restoration plan that fully mitigates for the filling of all wetlands (30.1 acres) which will be impacted, in any regard, from the Covered Activities.

1.6 Planning Area and Permit Area

This HCP consists of a Permit Area (2,072 acres) (Figure 2, Appendix A) and a Planning Area (35,445 acres) (Figure 3, Appendix A). The Permit Area is located within the lower Des Plaines River Valley and contains two federally designated CHUs for the HED (75 Fed. Reg. 21394-21453), and other areas in which activities that are likely to negatively affect the HED habitat (i.e. Covered Activities) will occur. The Permit Area contains springs, seeps, dolomite prairie communities, and other wetland habitats currently used by the HED, Blanding's turtle, and LPC and potentially by spotted turtle. Lakeside daisy is found in the Planning Area but not the Permit Area. The Permit Area also includes historic and potentially restorable habitat that may be used in the future by the Covered Species with the implementation of the conservation and mitigation measures included in this plan. HMS, along with ComEd and NRG Energy, and other private entities, own and/or manage land located within the Permit Area (Figure 3, Appendix A).

The Planning Area includes all HED habitat areas near the Permit Area and lands that have been determined to be important groundwater recharge areas for wetlands that provide habitat for the HED and other Covered Species located within CHUs 1, 2, and 7. All habitat areas for Covered Species (including CHUs) that potentially may be impacted by Covered Activities are also included in the Planning Area. The Planning Area includes portions of the Villages of Romeoville, Homer Glen, Lemont, Orland Park, and Cities of Crest Hill and Lockport (Figure 3, Appendix A). These municipalities, as well as other supporting partners (listed in Section 1.3) and non-participating entities, use or have authority or jurisdiction over land in the Planning Area. ComEd owns and manages land in both the Permit and Planning Areas, and the FPDWC and IDNR own and manage land within the Planning Area.

To address the contribution of groundwater to wetlands providing habitat for the HED and other Covered Species, HMS has conducted extensive groundwater data collection and modeling activities for over a decade at a number of parcels within the Permit or Planning Area that contain or are adjacent to habitat. Initial submittals to USFWS included groundwater monitoring and modeling reports for Lockport Prairie Nature Preserve (GAS 2008; GRAEF 2009) and HMS properties (STS/AECOM 2009). HMS has continued to collect hydrology-related data and has had AECOM expand and improve its groundwater model on the company's behalf. An expanded groundwater model, which includes all of HMS' mining and mitigation parcels and surrounding environs, was completed in 2012. A report detailing the construction of the model, input assumptions and preliminary results was submitted to USFWS in October 2012 (AECOM 2012). In response to USFWS and USGS comments (as technical reviewer for USFWS) on the October 2012 report and groundwater model, additional field data were collected in 2013. New data were incorporated into the model and further analyses were conducted. Field data collected in 2013 were submitted in a Documentation Report dated September 2013 (AECOM 2013a). Additional groundwater information, including response to comments, additional groundwater modeling analysis as well as field data and analyses, has been submitted periodically over the past seven years, including: AECOM (2013b, 2014a, 2014b, 2015a, 2015b, 2015c, 2016, 2017 and 2018) and HMS (2017 and 2018). Additional surface and soil water data were also collected and analyzed on many of the parcels in the Permit Area by AES (AES 2012).

These studies have primarily focused on evaluation of groundwater dynamics west of the Des Plaines River for areas such as River South Parcel, Lockport Prairie Nature Preserve, and Romeoville Prairie Nature Preserve. However, significant studies were also conducted east of the Des Plaines River and Illinois and Michigan (I&M) and Chicago Sanitary and Ship (CSS) Canals

for the ComEd and Long Run parcels. One study on the east side of the River provided qualitative estimates for the potential recharge zone for ComEd and Long Run parcels (AECOM 2011). These investigations have been used to evaluate potential impacts from surface mining and other development activities. Avoidance and minimization measures (AMMs) were developed for potential groundwater impacts and those conservation strategies are presented in this plan (see Section 5.1.3). Continued monitoring will allow for tracking and, if necessary, the refinement of these AMMs (see Chapter 6).

Critical Habitat Units

Critical habitat is defined in Section 3 of the Endangered Species Act as:

(i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species (16 U.S.C. §1532(5)(A)).

During the process of determining which areas to propose as critical habitat, the USFWS considers physical and biological features (primary constituent elements) that are essential to the conservation of the species and, within areas occupied by the species at the time of listing, may require special management considerations and protection.

In 2010, USFWS finalized the designation of critical habitat for the HED (USFWS 2010a). In Illinois, there are seven critical habitat units (CHUs) for the HED located along the lower third of the lower Des Plaines River Valley near Lockport. HMS owns property within CHUs 2 and 7, which make up much of the Permit Area (Figure 2, Appendix A). CHUs 1 and 3 are found within the Planning Area but outside the Permit Area. All CHUs within the Planning Area are described below.

CHU 1: Approximately 351 acres located in Will County, east of Route 53, north of Caton Farm Road, south of Route 7 and west of the Des Plaines River. CHU 1 is comprised of natural areas associated with Lockport Prairie Nature Preserve, ComEd ROW, Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) property and the NRG Energy, rail line.

CHU 2: Approximately 439 acres located in Will County, south of 135th Street, east of Route 53, north of Route 7, and west of the Des Plaines River (quarry areas excluded). Most of CHU 2 is owned by HMS including Middle Parcel (planned mining expansion site), River Parcel, River South Parcel, and Fitzpatrick Seep, North Parcel, Far North Parcel, and River North Parcel (planned mitigation sites). This CHU also includes ComEd ROWs.

CHU 3: Approximately 366 acres located in Will County and comprised of Romeoville Prairie Nature Preserve and ComEd ROW.

CHU 7: Approximately 447 acres located in Will County and includes ComEd and Long Run parcels (planned mitigation sites), IDNR's Long Run Seep Nature Preserve and ComEd easements (located on the east side of the Des Plaines River, south of 135th Street, and east and west of New Avenue).

1.7 Species to be Covered by the Permit

The selection process for the species covered in this HCP was established and initially completed in 2006. The records of occurrence from the previous 10 years for federal and Illinois listed species within the HCP Planning Area were reviewed. The process involved collaboration and coordination between agencies and landowners to review recent and historical data included in the Illinois Natural Heritage database. The process was repeated again in 2012 and applied to a new Planning Area to update the list of species covered in the HCP.

Based on this research, HMS, MWGen, and ComEd (previously referred to as the “Lead Partners” working on a coordinated HCP) compiled a short list of species for agency review. These three companies worked with USFWS and IDNR to reach a consensus that this HCP will cover federally listed animal and plant species and state-listed animals that had a record of occurrence within ten years within the Planning Area. Species that had not been recorded in the Planning Area in a decade or more (e.g. since 1996) were not included. The final listing of Covered Species, as agreed by the three companies and reviewed and approved by USFWS and IDNR in 2006, included the HED, Blanding’s turtle, spotted turtle, and leafy prairie clover.

In 2012, the list of Covered Species for the HCP was updated because the Planning Area had been expanded to include all 7 CHUs and the Illinois list of endangered and threatened species had been revised since the initial list was agreed upon in 2006. The update was completed by obtaining the current state-listed species in the vicinity of the revised Planning Area (from the Illinois Natural Heritage database through the IDNR) and applying the same set of criteria as was used in 2006. As a result, two additional species, the black-billed cuckoo and the Lakeside daisy, were added to the list of Covered Species. This list was agreed upon by the IDNR at a meeting on February 28, 2012. The federally listed species for the HCP were confirmed by the USFWS at previous meetings, including the decision to address the Blanding’s and spotted turtles at the federal level. These turtle species are included in the federal ITP application because they were petitioned for listing at the federal level in 2012 and may become listed during the duration of the ITP. The Planning Area for this HCP includes four of the seven CHUs (CHUs 1, 2, 3 & 7). The black-billed cuckoo has been found only in CHU 5, located north of the Planning Area, and thus is not included in this HCP.

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2.0 ENVIRONMENTAL SETTING and BIOLOGICAL RESOURCES

2.1 Environmental Setting

5 The Permit Area is located within and immediately adjacent to the Lower Des Plaines River Valley
 in Will County, Illinois (Figure 1, Appendix A). It is 2,072 acres in size, and its boundaries were
 drawn to include all properties in HMS' Romeoville facility (Figure 2, Appendix A). As stated
 before, HMS does not own or control all the land within the Permit Area. HMS' properties within
 10 the Permit Area are listed in Table 1, below, and total 1,437 acres. HMS properties include
 production facilities with surface limestone mines, roads, conveyors, sorting and screening
 operations, an office, and a shipping port on the canal. These facilities also include closed landfills
 as well as other operations and uses. HMS' holdings also include properties purchased for
 conservation purposes and are included in the mitigation plan of this HCP. Other operations on and
 adjacent to HMS property within the Permit Area include an asphalt plant owned by Palumbo, a
 15 ready-mix concrete plant operated by Prairie Materials, a pre-stress concrete plank plant operated
 by Illini Precast, a concrete pipe yard owned by Lucky Development and operated by Concrete
 Specialties, and a concrete crushing facility operated by Concrete Xchange. NRG Energy and
 ComEd also have properties and easements within the Permit Area (Figure 3, Appendix A). These
 include NRG Energy's Will County Station and railroad properties and ComEd's substation,
 20 ROWs, and transmission easements.

Table 1. HMS Properties within the HCP Permit Area.

Hanson Material Service Properties	Acreage
ComEd Parcel	103.0
East Parcel	46.7
East Quarry	218.7
Far North Parcel	50.4
Fitzpatrick Seep	5.5
Lockport Shop Parcel	75.0
Long Run Parcel	182.6
Middle Parcel	124.9
Middle Quarry	80.1
North Parcel	31.4
Pierce-Eich Quarry	268.5
River North Parcel	24.8
River Parcel	61.0
River South Bluff Parcel	23.7
River South Parcel	65.7
Stone Processing Parcel	74.9
HMS Total	1,436.9

25 The Planning Area is 35,445 acres, and its boundaries were drawn to include the Permit Area,
 CHUs adjacent (or nearly adjacent) to the Permit Area (CHUs 1, 3, and the remainder of 7), and the
 estimated ground water recharge area (and buffers, where estimated) for springs and wetlands in
 CHU 1, River South Parcel in CHU 2, and ComEd and Long Run Parcels in CHU 7 (Figure 4,

Appendix A). All habitat areas for Covered Species (including CHUs) that potentially may be impacted by Covered Activities are also included in the Planning Area. As a result, the Planning Area includes portions of Romeoville, Crest Hill, and Joliet on the west side of the river, and Lockport, Homer Glen, Lemont, and Orland Park on the east side (Appendix A, Figure 3). Most of the estimated recharge areas and buffers to CHU 1 & 2 contain residential development and agricultural land (Figure 5, Appendix A). The area within the recharge area is dominated by agricultural land but also contains much developed land (i.e. institutional, transportation, and industrial) and some open land, whereas the area outside the recharge area but within the two mile buffer is dominated by residential development with some agricultural land, open space, and other development. Large portions of the area within the recharge zones are owned or managed by individual public or private entities, including Lewis University, Joliet Port Authority, and the FPDWC (Figure 4, Appendix A). The estimated recharge zone for CHU 7 is dominated by residential development, agricultural land, and open space. In addition, this area contains numerous smaller landowners than those on the west side of the river, except for FPDWC which owns/manages several preserves in this area. Further, these FPDWC sites contain several areas of higher potential recharge within the estimated recharge zone (AECOM 2011). Long Run Seep Nature Preserve (part of CHU 7), owned by Illinois Department of Natural Resources (IDNR), is also located in this part of the Planning Area. The FPDWC and IDNR are conservation agencies that manage land with the goal of supporting biodiversity and other natural resources, scientific research, and public education. In addition, Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) owns numerous vacant properties along the river and canals for flood control and water conveyance. ComEd also has ROW and easements in both the Planning and Permit Areas.

2.1.1 Climate

The lower Des Plaines River Valley is situated in Will County, Illinois, which has a temperate, humid, continental climate. The State Climatologist Office for Illinois has summarized climate normals from the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (Illinois State Water Survey 2012). Climatic normals for the Lewis University Airport weather station (Romeoville WFO), which is located in the Planning Area, are based on a thirty-year average from years 1981 to 2010. The warmest month of the year is July with an average high temperature of 84.0 °F, whereas January is the coldest month of the year with an average low temperature of 15.8 °F. Average annual precipitation is 40.07 inches per year with July being the wettest month averaging 4.71 inches of precipitation. Average annual snowfall is 32.3 inches per year, the majority of which falls in December and January (average of 9.3 and 10.8 inches per month respectively).

It is possible that climate change will influence the Planning Area and Covered Species over the term of the HCP. The Chicago Climate Action Plan (2008) states that temperatures have risen by 2.6 °F since 1980 and that 15 of the last 20 years have experienced above average annual temperatures. Potential climate change impacts relevant to this HCP include longer growing seasons, range and distribution changes for plants and animals, earlier onset of plant blooming and animal migration in spring, variation in the timing, intensity, and amount of precipitation, increased surface and groundwater temperatures, later freeze dates, and earlier ice-off dates. The extent of these possible effects on the HCP and Covered Species are addressed in more detail in Chapter 8.

2.1.2 Topography and Geology

A portion of the Des Plaines River Valley from just southwest of Chicago’s Midway Airport to Joliet is notable for its glacial history and resultant landscape. The HCP Planning Area lies on the northern flank of a Paleozoic bedrock structure known as the Kankakee Arch, which separates the Illinois and Michigan Basins. As a result of this structure, the bedrock has an easterly dip, resulting in exposure of the oldest formations along the Des Plaines River. The near surface bedrock formations are sedimentary rocks formed in ancient, shallow to deep seas. In the area of the Des Plaines River Valley, this is primarily Silurian Period limestone bedrock of the Niagara Series. Covering the bedrock are deposits of flagstones, cobble, and gravel deposited by outlet flow from glacial Lake Chicago. On the lower terrace is a layer of alluvium deposited by the Des Plaines River. Vertical cliffs were carved by torrential meltwaters from this most recently glaciated portion of Illinois.

Areas within the lower Des Plaines River Valley have well-drained glacial outwash soils that support seeps, fens, and springs. Areas of exposed limestone create a harsh environment that supports a number of hardy plants. While the low gravel ridges parallel to the river stay dry, the floodplain environments stay wet for long periods. The highly resistant surface rocks and “tight” layering of underlying limestone rocks have both a seasonally high water table and also do not quickly encourage infiltration of ground water. Therefore, seasonally wet or inundated conditions are common in some areas. The fens, marshes, and wet prairies that occur in low spots, including dolomite prairies, add to the variety of habitats and resultant biodiversity. Groundwater recharge areas for the seeps extend beyond the Des Plaines River geologic valley and into glacial till deposits (Figure 4 & 5, Appendix A). Throughout its current range, the Hine’s emerald dragonfly (HED) is typically known to occupy areas where limestone is near the surface and groundwater is emerging as seeps or springs (USFWS 2001; 75 FR 21394-21453). Like much of the Chicago area, natural land cover has been extensively altered through increasing urbanization. Expanding development, as well as the encroachment of invasive plant species, continues to be a major stressor on the dolomite prairie habitat and the HED (IDNR 2005).

2.1.3 Hydrology: Groundwater, Wetlands, Surface Water

Groundwater

Several recent studies have investigated groundwater hydrology within the HCP Planning Area which included studies at Illinois Nature Preserves and at HMS properties. Graef, Anhalt, Scholemer and Associates (GAS), completed studies of the Lockport Prairie Nature Preserve and Romeoville Prairie Nature Preserve (GAS 2004b, 2005a, 2005b, and 2008). Reporting completed for these studies included discussion on recharge zones, water balance estimations, and predictive groundwater modeling. Similar investigations and modeling have been conducted by AECOM on behalf of HMS for their properties, including the River South, West Quarry (Pierce Eich), Middle Parcel, ComEd, and Long Run Parcels (STS/AECOM 2009; AECOM 2012). In addition, predictive modeling of future surface mining in the Romeoville Quarry was conducted to evaluate possible groundwater conditions in the River South Parcel and other nearby CHUs including Lockport Prairie and Romeoville Prairie Nature Preserves (AECOM 2012, 2013a, & 2013b). Additional groundwater information, including response to comments, field data and analyses, has been submitted periodically over the past six years, including: AECOM (2014a, 2014b, 2015a, 2015b, 2015c, 2016, 2017 and 2018) and HMS (2017 and 2018).

Infiltration in the recharge zones supplies the shallow aquifers that feed the springs, seeps, and wetlands known to support the HED and the turtle species. AECOM investigations have provided

the hydraulic properties of the aquifer in the vicinity of the Romeoville Quarry and have documented groundwater levels and flows of groundwater that discharge to larval habitat areas within the Permit and Planning Areas. Predictive groundwater modeling simulations have been conducted for future mining construction. Several hydrologic enhancements have been proposed to eliminate potential impacts from mining on the local sensitive receptors of groundwater discharge.

The HCP study area is based on the estimated groundwater recharge zones developed by GRAEF (formerly GAS) and AECOM. GRAEF hydrologists estimated the probable groundwater recharge zones for the primary seasonal seepage locations found in Lockport Prairie (CHU 1) and River South (CHU 2) (GAS 2004b, 2005a, and 2005b) (Figure 4, Appendix A). The recharge area for ComEd and Long Run Parcels (CHU 7) on the east side of the Des Plaines River was delineated by AECOM (2011) (Figure 4, Appendix A).

GRAEF determined recharge area delineation for all areas using “flow net analysis” of the Silurian Aquifer potentiometric surface. They delineated three zones for each parcel, including: 1) the primary recharge area, 2) a recharge area buffer, 3) and a 2-mile buffer, which included lands adjacent to the recharge area (Figure 4, Appendix A). The primary recharge area is defined as the area in which infiltrating precipitation has the greatest potential for supplying water to each respective parcel. Recharge area buffers are described as the widest estimated areas that may provide some limited infiltrated surface water to the parcels. The two-mile wide buffer was developed subjectively based on the average contribution area for a municipal water supply well. HMS has conservatively included the two-mile buffer into the HCP study area to ensure the area was evaluated and land-use can be effectively managed in the future.

The recharge area for groundwater discharging to and flowing beneath the ComEd and Long Run Parcels (CHU 7) was delineated by AECOM (2011). The estimated recharge area is very large (22.7 square miles) and extends southeast from the parcels approximately 11 miles (AECOM 2011) (Figure 4, Appendix A). This is several times the size of the recharge zones for Lockport Prairie (CHU1) and River South (CHU 2) on the west side of the river, but all areas extend to the highest potentiometric surfaces that divide groundwater flow on each respective side of the river. The estimated recharge zones and buffers have been used to define the extent of the Planning Area because maintaining groundwater recharge function is considered to be important for preserving the springs and suitable HED habitats on each of these properties. Recharge areas have not been documented for the other CHU’s.

Additional development (or re-development) activities, such as residential and commercial building, road construction and maintenance, citing of new landfills, other mines, construction or alteration of municipal and private wells, or any other activities that increase impervious surfaces or alter surface drainage patterns, may alter groundwater quantity, flow direction, or quality. Thus, recharge areas and buffers are included for planning purposes since there is a potential for land use changes, however small, to negatively affect quantity and quality of groundwater reaching the HED habitats in these areas (GAS 2005a; GAS 2008; USFWS 2005).

Wetlands

HMS has identified wetlands on all its parcels within the Permit Area that are involved in planned mining or conservation activities. Figures 6.1 & 6.2 in Appendix A show current delineated or field-verified wetland areas on the HMS properties. HMS followed the methods and procedures outlined in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual (USACE 1987) to

conduct wetland delineations on its properties within the Permit Area, except those currently being used in mining operations. Wetland acreage for each of these parcels is found in Table 2.

5 **Table 2.** Wetlands on HMS Properties involved in planned mining or conservation activities within the HCP Permit Area.

Hanson Material Service Properties	Wetland Acreage
East Parcel	0.0
Far North Parcel	14.5
Fitzpatrick Seep	1.9
ComEd Parcel	61.1
Long Run Parcel	175.8
Middle Parcel	29.7
Middle Quarry	0.0
North Parcel	19.6
Pierce Eich Quarry	0.0
River North Parcel	13.6
River Parcel	40.8
River South Bluff Parcel	2.39
River South Parcel	62.3
Stone Processing Parcel	0.0
Total Wetlands	421.8

10 Wetlands are changing on each of these and other properties within the Planning Area, including within the protected and managed nature preserves. In the time that the HED has been under careful investigation, some of the highest quality wetlands (e.g. sedge meadows) have been invaded by aggressive weedy species, such as cattails (Mierzwa 2008). Unmanaged cattail thatch reduces access that ovipositing adult HED require and has changed the patterns used by foraging HED. Invasive plant species, such as common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), narrow-leaved and hybrid cattail (*Typha angustifolia* and *Typha X glauca*), purple loosestrife (*Lythrum salicaria*), and smooth and European buckthorn (*Rhamnus frangula* and *Rhamnus cathartica*), represent a great risk to wetland biodiversity and the HED habitat. These species can reduce wetland biodiversity through aggressive competition, shade suppression, thatch build-up, and dewatering (Chicago Region Biodiversity Council 1999; Zedler and Kercher 2004). AES has observed the expansion of common reed and buckthorn on HMS properties over the past 12 year as reflected in revised vegetation / land cover maps of the parcels (e.g. Middle, North, Far North, and ComEd Parcels).

Other activities which may contribute to the degradation of wetlands in the HCP Permit Area include:

- 25 • historic agricultural ditches through wetlands
- nutrient and contaminant (e.g. deicing materials) loading in storm water runoff from nearby local roadways and communities
- erosion and sedimentation
- ground water impacts from land use and development activities

- hydraulic segregation due to railroad beds and roadways

Surface Water

5 Most of the Permit Area and the central portion of the Planning Area are located within the lower Des Plaines River Valley which is part of a 378-square-mile watershed that includes portions of Cook, Will, and DuPage Counties. The mean annual precipitation for the basin is approximately 35 inches. The minimum watershed elevation (538 feet msl) is at the southern boundary of the Planning Area just north of Joliet and the maximum elevation is in the northwestern portion of the watershed in Cook County near Inverness (690 feet msl) (IDNR 2000).

10 The Des Plaines River is the main river system present in the valley. Waterways within the HCP Planning Area include the Illinois and Michigan (I&M) Canal, Chicago Sanitary and Ship (CSS) Canal, Long Run Creek, Fiddymont Creek, and Mink Creek. The I&M and CSS Canals were excavated to allow shipping by barge. Both Canals generally parallel the Des Plaines River. Long Run and Fiddymont Creeks are located east of the Des Plaines River and flow into the I&M Canal. Mink Creek is located west of the river and flows west to the DuPage River.

15 Aside from Long Run and Fiddymont Creeks, there are no named tributaries to the Des Plaines River within the HCP Planning area. However, water from surface, storm water, and groundwater sources flow to the Des Plaines River via ditches or small rivulets (sometimes called streamlets) that flow through wet dolomite prairies, marshes, and floodplain forests.

20 The majority of the slope of the watershed is one foot per mile; however, the slope is steeper between Lockport and Joliet where it is approximately 5.25 feet per mile. The valley above Lockport is surrounded by 80-100-foot bluffs that are located 1,500 to 2,500 feet east and west of the Des Plaines River (IDNR 2000). The bluff height within the Planning Area, however, is variable.

2.1.4 Vegetation

Historic Conditions and Trend

30 According to early aerial photographs (Figure 7, Appendix A), maps and original land survey records (INHS 2002) (Figure 8, Appendix A), the Permit Areas historically contained extensive grassland that transitioned to open wetlands. Some wooded riparian areas with scattered oak savanna and small forest copses were also present. Examples of remnant grassland and open wetland are found in some FPDWC preserves within the Planning Area.

35 The pre-settlement vegetation in the Permit Area, which is mostly within the river valley, was almost all prairie and wetland (Figure 8, Appendix A). The Planning Area outside the Permit Area and west of the river valley was almost all prairie, whereas the east side was a mix of prairie and woodlands, including forests and savanna. Some wetlands were found on the east side of the Planning Area in low-lying areas with hydric soils. Over time, a majority of land has been converted from pre-settlement prairies, woodlands, and wetlands to agricultural uses as well as residential, industrial, and other commercial development. (Figure 5, Appendix A).

Current vegetation

Vegetation found in the Permit and Planning Areas within the river valley ranges from remnant high quality natural areas, such as Lockport Prairie, Romeoville Prairie, and River South, to disturbed or degraded vacant areas, to highly altered lands, such as developed areas and quarries (Figure 5, Appendix A; HMS existing condition maps, Appendix F). These disturbed areas include large areas that have been used for decades for approved landfills that have since been closed, scraped and spoil areas, ditches, dikes, old railroad beds, power lines, railroad easements, and fence lines. Most of these disturbed lands are dominated by weedy and invasive plant species and provide little or no habitat for the Covered Species. The vegetation found in the Planning Area outside the Permit Area includes conventional landscaping in developed areas, some areas of natural land-cover, and many other areas of row-cropped agricultural fields.

Both native and non-native plant communities are found within both the Permit and Planning Areas in the river valley. Native plant communities include dolomite prairie, sedge meadow, emergent marsh (cattail or bulrush), wetland shrubland, upland woodland, and young floodplain forest. Non-native communities include marsh (common reed), wet meadow (reed canary grass), turf, Eurasian meadow/old field, and upland shrubland (European buckthorn).

Even the remnant natural areas (e.g. Lockport and Romeoville Prairies) have experienced some level of direct and/or indirect impacts from the initial agricultural conversion, such as livestock grazing, and subsequent development activities. In addition, invasive plants, both woody and herbaceous, continue to threaten these remnant communities, particularly their diversity, composition, structure, and ecological function. Groundwater-fed natural wetlands dominated by graminoid (grass-like) plants, such as marsh, sedge meadow, and dolomite prairie, with underlying limestone bedrock are the remnant communities that provide habitat to the HED (USFWS 2005). These communities may have been impacted by changes in groundwater due to increased development in the recharge areas (GAS 2005a and 2008).

2.1.5 Wildlife

Changes in vegetation and wildlife habitat within both the Permit and Planning Areas have been considerable over time, with the exception of the few remaining natural area remnants. Consequently, these areas now primarily support common urban wildlife species. Most of the native wildlife diversity of the region and in the Permit and Planning Areas has declined or has been extirpated, with exceptions for those species that flourish in urban environments (Chicago Region Biodiversity Council 1999; Chicago Wilderness consortium 2006; Greenberg 2002). Species such as white-tailed deer and raccoons have increased dramatically in abundance in recent decades in urban and suburban areas due to their ability to adapt to increasingly metropolitan environments (Etter 2002; Gehrt 2004). Animals such as Virginia opossums and striped skunks also compete well in disturbed settings (Gehrt 2004). Most of the native wildlife that was present in the pre-settlement ecosystems in the Permit and Planning Areas is now found at low levels of abundance (Chicago Region Biodiversity Council 1999; Chicago Wilderness consortium 2006). However, many rare and declining native species are still found in the largest remnant natural areas in the Permit and Planning Areas (e.g. nature preserves and HMS properties).

Hundreds of bird species protected by the federal Migratory Bird Treaty Act spend at least some portion of the year within the HCP Planning Area, which provides suitable breeding habitat and important migratory stop-over habitat for birds. Birds known to occur within the HCP Planning Area include waterfowl, shorebirds, raptors, waterbirds, and landbirds. Common waterfowl species include Canada goose, wood duck, mallard, American black duck, blue-winged teal, and

bufflehead; while common waterbirds include double-crested cormorant, great blue heron, great egret, and sora. Raptors within the HCP Planning Area include sharp-shinned hawk, Cooper's hawk, red-tailed hawk, bald eagle, American kestrel, and great horned owl. Shorebirds expected to occur within the HCP Planning Area during some portion of the year include killdeer, greater yellowlegs, lesser yellowlegs, solitary sandpiper, spotted sandpiper, American woodcock, and Wilson's snipe. Landbirds within the HCP Planning Area include downy woodpecker, hairy woodpecker, eastern wood peewee, willow flycatcher, red-eyed vireo, blue jay, American crow, tree swallow, black-capped chickadee, white-breasted nuthatch, house wren, American robin, gray catbird, cedar waxwing, yellow warbler, black-and-white warbler, American redstart, ovenbird, common yellowthroat, scarlet tanager, northern cardinal, indigo bunting, song sparrow, field sparrow, chipping sparrow, savannah sparrow, swamp sparrow, brown-headed cowbird, red-winged blackbird, common grackle, Baltimore oriole, house finch, and American goldfinch.

The bald eagle, which is afforded protection by the federal Bald and Golden Eagle Protection Act, is known to occur within the HCP Permit Area. A pair of bald eagles has been nesting on an island within the Des Plaines River since at least 2010, and bald eagles use the river corridor during their annual spring and fall migration. Golden eagles are not known to nest or winter within the HCP Planning Area. USFWS was contacted about the eagles by HMS in April 2010. The local USFWS eagle expert observed the nesting pair during blasting in the West (Pierce Eich) Quarry on May 18, 2010. The USFWS representative stated that the blast was faintly acknowledged by an adult eagle and unnoticed by the eaglets inside the nest. The conclusion was that the breeding pair is accustomed to the disturbance near the nesting site – including the quarry, train traffic, and airplanes (pers. comm. with M. Sailor, USFWS 2010).

2.1.6 Existing Land Use

Present day land use across the Permit and Planning Area is depicted in Figure 5 in Appendix A. Current land use is a highly fragmented mix of residential and industrial development, agriculture, and public and privately-held open space.

2.2 Species of Concern in the Program Area

This section provides a summary of each of the HCP Covered Species.

2.2.1 Wildlife Species of Concern

Following are the species for which HMS is seeking a federal ITP and a state ITA. Take of a listed animal species requires a federal permit and/or state authorization, whereas take of listed plants do not.

Hine's Emerald Dragonfly

Species Description

The HED is a moderately large species of dragonfly with a wingspan of 3.5 to 3.7 inches and a body length of 2.3 to 2.5 inches. The body is dark brown to dark metallic green with a pair of yellow lateral strips on each side and bright green eyes (Vogt and Cashatt 1994; USFWS 2001). The HED larvae are light to dark brown aquatic nymphs. They are typically densely covered in setae, which gives them a "hairy" appearance. The final instar head width is greater than 6.0 mm and total length greater than 20.0 mm (Foster and Soluk 2004; Soluk et al. 2009). A detailed

discussion on the HED larval characteristics is presented in Cashatt and Vogt (2001) and Soluk et al. (2009).

Life History and Habitat

5 The HED breeding season lasts from early June to late August in Illinois (USFWS 2001; Vogt and Cashatt 1994, 1997). Females oviposit (lay eggs) in shallow water of rivulets and channels or in muddy depressions within marsh or sedge meadows, depositing 500 - 1,000 eggs (D. Soluk and R. Demots, University of South Dakota, pers. comm. 2013). Eggs overwinter and hatch in the spring (Soluk and Satyshur 2005). Based on studies of other dragonfly species (Duffy 1994 and Wissinger 10 1998), the survival rate of the HED eggs to mature larvae is likely less than 1% to 5.5% but possibly lower (D. Soluk and R. DeMots, University of South Dakota, pers. comm. 2012). In general, dragonfly larval mortality is extremely high during the first few larval instars. This natural mortality is a result of predation, cannibalism, and sometimes starvation. However, very small larvae (headwidth < 2.00 mm) grow faster than larger larvae (Satyshur 2008).

15 Hine's emerald dragonfly eggs overwinter and subsequent larval development has been shown to take 3-5 years (Soluk and Satyshur 2005). Captive rearing experiments, Soluk et al. (2009) estimate that larval development is 4.87 winters to emergence. Approximately 8% of the larval population, age 1 or above, are pre-emergent (e.g. prior to emerging as adults) referred to as F-0 larvae (Foster and Soluk 2004).

20 The larvae have the capability to move about a terrestrial environment, a characteristic that may set them apart from other aquatic insect larvae (Soluk et al. 1999). The HED larvae are restricted to wetland habitats (e.g. marshes, seeps, and sedge meadows) with thin soils over limestone bedrock (USFWS 2001; USFWS 2005; Nuzzo 1995; and Mierzwa et al. 1998). Larvae eat smaller insects and shed their skin many times. The HED larvae then crawl out of the water and shed their skin a final time, emerging as flying adults.

30 Adult HED use wetlands as well as a mixture of adjacent uplands. Adults will also fly over and forage in open upland areas such as meadows and old fields (Vogt and Cashatt 1994) but will avoid large areas of open water and dense shrub thickets or forested areas (USFWS 2005). In addition, they have been documented to travel several miles (Mierzwa et al. 1995). There is some evidence that females use upland habitat during non-breeding times to avoid interactions with males (Soluk 2005; Foster 2001). The adult HED flight season in Illinois can start as early as late May and ends 35 in early October (Vogt and Cashatt 1994; Soluk et al. 1996; Mierzwa et al. 1997). The peak of adult emergence normally occurs in July, and few adults are observed after mid-August. Adult HED typically live at least two weeks and can live up to six weeks (Soluk et al. 1996; Mierzwa (editor) 1995; USFWS 2001).

40 HED ecology is linked with the ecology and behavior of the burrowing devil crayfish (*Cambarus diogenes*) and possibly other species of burrowing crayfish. The burrows of the devil crayfish provide refuge for the HED larvae both from dry conditions in mid to late summer, and during the winter (Soluk et al. 1999; Pintor and Soluk 2006).

45 *Range and Location*

The HED was first described from sites in northwestern Ohio (Williamson 1931; Vogt and Cashatt 1994) and it is currently thought to be extirpated from Ohio and Indiana. The Northern Recovery Unit consists of documented HED sites in Door and Kewaunee Counties in Wisconsin, and sites in Alcona, Alpena, Charlevoix, Mackinac, Menominee, and Presque Isle Counties in Michigan. The

Southern Recovery Unit consists of sites in Iowa, Ozaukee and Richland Counties, Wisconsin; Cook, DuPage and Will Counties, Illinois; and Dent, Iron, Phelps, Reynolds, and Ripley Counties in Missouri (USFWS 2013). The HED is known to occur at several sites in Illinois, shown in Table 3 (USFWS 2005; Mierzwa and Webb 2012d; Mierzwa and Webb 2014; Soluk 2005; Soluk et al. 2007; Soluk and Worthington 2010). The Illinois sites occur along an approximately 18-mile length of the lower Des Plaines River Valley (13 miles) and the Cal-Sag Channel (5 miles) with the largest portion of the population in the Planning Area (Figures 9.0-9.7, Appendix A). Adult HED have also been recently found 30 miles northwest of this area at Spring Lake Nature Preserve and Spring Creek Valley Forest Preserve in Cook County (Cashatt 2016; Soluk et al. 2016) as well as further to the west in Winnebago County, IL (Gibbons 2020).

Table 3. Known HED Occurrences in Illinois CHUs, as of 2014.

Site Name	CHU	Land Manager	HED Occurrence (by lifecycle stage)
Crest Hill Sewage Treatment Plant*	N/A	City of Crest Hill	Adult and larval
Lockport Prairie Nature Preserve	1	FPDWC	Adult and larval
North Parcel	2	HMS	Adult
Middle Parcel	2	HMS	Adult and historic larval
River Parcel	2	HMS	Adult
River South Parcel	2	HMS	Adult and larval
Romeoville Prairie Nature Preserve	3	FPDWC	Adult and potential larval
Black Partridge Forest Preserve	4	FPDCC	Adult and potential larval
Keepataw Preserve	4	FPDWC	Adult and larval
Waterfall Glen Forest Preserve	5	FPDDC	Adult and larval
McMahon Woods Nature Preserve	6	FPDCC	Adult and larval
Long Run Seep Nature Preserve	7	IDNR	Adult and larval
ComEd and Long Run Parcels	7	HMS	Adult and historic larval

*Not shown on the Figures in Appendix A. Outside CHUs and GIS data not available.

The HED habitat locations within the Planning Area are shown on Figure 9.0 - 9.7 in Appendix A. Historic habitat is an area that was occupied or provided suitable habitat in the past, but no longer provides suitable habitat. Potential larval habitat is an area that has the correct habitat characteristics for HED larvae to be present, but they have not been identified at that location. Both HED adult-use and larval-production areas are indicated on this figure. The Habitat Mapping Protocol (Appendix B) describes the protocol used to map the HED adult and larval habitat, which was developed by HMS, MWGen, and ComEd in consultation with USFWS and leading HED biologists (K. Mierzwa and D. Soluk). The amount (acres) of HED adult and larval habitat found within each CHU, as shown in Figures 9.0 – 9.7, is listed in Table 1 of Appendix B. In addition to the areas shown on the maps and identified in the table above, the HED adults have been documented outside CHUs but within the Planning Area at Dellwood Park West and Lockport Prairie East and outside the Planning Area at Argonne National Laboratories just north of CHU 5 (Soluk 2019).

Population Size and Genetics

“Population” is defined as a group of individuals of the same species, co-existing at the same time and in the same geographic area and capable of interbreeding (Purves et al 1998). For the purposes of the USFWS HED Recovery Plan, the lower Des Plaines River Valley is considered one population. The USFWS HED Recovery Plan defines a subpopulation as a local population occurring at a specific geographic site, such as Lockport Prairie Nature Preserve. A subpopulation

may include more than one local population (e.g. separate and specific larval habitat) when adult HED habitat ranges cover a number of these nearby specific breeding sites. This co-mingling of adult HED from different larval sites allows for genetic exchange between the sites. In cases where larval habitat constitutes what appears to be separate subpopulations, but adult HED habitat is contiguous (e.g. Middle Parcel, River South, and Lockport), the geographic area used by the adults defines the edges of the subpopulation because it is assumed that the adult HED are freely using the entire area and genetically mixing (USFWS 2001). Treating all HED in the Lower Des Plaines River Valley as part of one population is also supported by the results of a recent genetic study which indicates that HED from various habitat sites in the Lower Des Plaines River Valley of Illinois are all part of one genetic population (Monroe and Britten 2014).

Tables C-1, C-2 and C-3 in Appendix C provide a summary of the recorded foraging-flying adult HED in HMS' Middle, ComEd, Long Run, and River South Parcels (Mierzwa and Webb 2012a and 2012b). Data indicate population numbers have been lower in recent years in these parcels. A sudden drop in the HED population numbers at Middle and River South Parcels occurred after the 2005 drought and as a result the population numbers were lower between 2005 and 2011 than they were in the previous ten years (1995-2004). Conditions that could influence the data, such as weather, may vary from year to year; because of the long HED larval period, drought or flood events can potentially influence the size of HED cohorts for several years. Based on the results of the most recent adult HED surveys in Middle (2011) and River South (2012) Parcels, current adult HED populations are estimated to be four and 71 individuals in these parcels, respectively. River Parcel adult HED population is estimated to be 10 individuals based on its most recent survey (2013), and the current adult population in ComEd and Long Run Parcels is estimated to be about five individuals based on the 2011 survey results. The Keepataw site has been monitored extensively since 2004 (Soluk 2005; Soluk et al. 2011) and estimated adult HED population size is 10 +/-4 (Soluk and Mierzwa 2012). In addition, recent adult HED surveys have been completed along rail lines within the Planning Area, but population estimates were not calculated as part of these studies (Soluk and Worthington 2010; Mierzwa et al. 2010).

The current HED (larval) population size in Illinois (lower Des Plaines River Valley) was estimated by Soluk and Mierzwa (2012) to be 2,063 and, based on standard error, may be in the range of 1,000 – 3,000. For this study, all larval survey data collected in the most productive sites in Illinois was compiled and analyzed to generate larval population estimates at each site (and each breeding location within each site) and to provide an estimate for the entire HCP Planning Area. Data used in the analysis were collected in Lockport Prairie Nature Preserve, Long Run Seep Nature Preserve, Keepataw Forest Preserve, and HMS' River South, Middle, Long Run, and ComEd Parcels. In addition, this data was compared to adult HED data from HMS' parcels collected in the same years to check and help calibrate total (larval and adult) population estimates. Using the calibration model, the adult HED population was estimated to be within the range of 87 - 243 adults (estimate includes standard error - Soluk and Mierzwa 2012), far from the recovery criteria of 1,500 adult HED and well below what most research (Shtickzelle et al. 2005; Traill et al. 2007; Frankham et al. 2010) suggests is required to maintain a viable insect population. At Illinois sites with adequate datasets, numbers have been reduced since about 2002 but have fluctuated since then. In addition, the core of the Illinois population is currently concentrated at two sites, with one site, Lockport Prairie, contributing 54-56% and another, River South, contributing 30-35% to the Illinois population, or combined 84-91% of the entire Illinois population.

this species indicating five separate populations within the study area: one population in Illinois; a second in Ozaukee County (Cedarburg Bog), Wisconsin; a third in southwest Wisconsin (Lower Wisconsin River); a fourth that is in Kewaunee and Door Counties, Wisconsin; and a fifth population in the Upper Peninsula of Michigan (Monroe and Britten 2014). The assignment of individual sites to populations reflects the information from this research as well as the known flight distance of the species (USFWS 2013). Based on mark recapture HEDs can fly at least 3.4 miles (5.5 km) (Mierzwa et al. 1995a; Cashatt and Vogt 1996) but most likely not further than 30 miles (48.28 km) (D. Soluk, pers. comm. 2012).

Allelic richness is greatest in the Illinois population and lowest in the two northern populations found in Door Peninsula, WI, and the Upper Peninsula, MI (Monroe and Britten 2014). Most genetic variation is within populations (91%) with very little genetic variation among sites within populations (3%) and among populations (6%). However, this level of genetic diversity may not be maintained by regular gene flow in the future due to the loss of stepping stone habitats that must have existed previously based on the species dispersal capabilities.

Based on tenets of genetics, the long-term viability of any species is based on a combination of population size and genetic diversity that are essential to counteract catastrophic events (Dudash and Fenster 2000). In order for a species to persist, its population-level genetic diversity must be maintained and distinct haplotypes (genetic variants) must be preserved. For some species, even a small loss of genetic diversity will preclude a species' ability to withstand significant changes to the environment.

Based on recent genetic analyses by Dr. Meredith Mahoney (pers. comm. 2012), of 141 samples of Hine's emerald dragonfly tissue analyzed for mitochondrial DNA (mtDNA) variation, there are 21 haplotypes rangewide, with up to six differences (1.1%) among them. Missouri exhibits the greatest genetic diversity across the range of the species with 13 of the 21 haplotypes found in Missouri including 10 that are unique to the state; whereas, Michigan has been found to only contain one haplotype and Wisconsin has four haplotypes.

Hine's emerald dragonfly sites in Illinois had previously been thought of as being the most genetically diverse (Purdue et al. 1996) prior to the discovery of sites in Missouri (M. Mahoney, pers. comm. 2012). There are six different haplotypes that have been found in Illinois, four of which are unique to Illinois, with up to five differences (0.92% divergence) among them. The differences (number or %) are the maximum observed base pair substitutions between haplotype pairs looking either range wide or just within Illinois or other regions. Some haplotype pairs have only one or two differences between them. The four unique haplotypes were all found in sites (Lockport Prairie Nature Preserve, River South and Middle parcels, and Romeoville Prairie) within a close proximity (approx. 4.25 miles (6.84 km)) of each other. The haplotypes unique to Illinois are B, C, E, and F. Alternatively, haplotype D, which is found across the species range, has not yet been found in Illinois, though two other widespread haplotypes (A and G) do occur. Analyses of museum samples from extirpated Ohio populations found genetic variants that are not seen in other, extant, populations (Purdue et al. 1996 and Mahoney pers. comm. 2012). Range wide analysis showed little geographic structuring of genetic variation and most variation (77-86%) is within states (Mahoney pers. comm. 2012). Due to the relatively high genetic diversity and unique haplotypes in HED populations in Illinois and Missouri, the long-term viability of the species range-wide would be compromised if the genetic diversity of these populations is threatened.

5 While the populations in the southern portion of the species range (Missouri and Illinois) are believed to be smaller, there is greater genetic diversity within the southern populations which makes them extremely important to the survival and recovery of the species. Alternatively, the populations in the northern portion of the species range (Wisconsin and Michigan) are larger yet have less genetic diversity.

10 The vulnerability of HED southern populations and the species as a whole to effects from demographic and genetic stochasticity may be increasing due to the severity of the threats to the small populations. Demographic stochasticity can cause small populations to vary widely in size. Genetic stochasticity is random changes in a population's genetic makeup that can have deleterious effects on the ability of individuals to survive and reproduce. A drastic reduction in population size can exacerbate the effects of genetic stochasticity or can lead to the further decline of a population to extirpation. As a population loses individuals, it may lose genetic variation, which may reduce the species' fitness or ability to cope with environmental change. So while the southern populations may currently contain genetic diversity that may be necessary for the species to survive and adapt in a changing environment, the potential for the southern populations to become extirpated is compounded by several direct and indirect threats and by small population sizes, which compromise the viability of the species rangewide.

20 *Conservation Status*

The HED is a federally and state-listed endangered species that survives in Illinois, Wisconsin, Missouri, Michigan, and Ontario, Canada. The first recorded occurrence of this species in Illinois was a collection from 1983 that was not confirmed until 1987 (Cashatt and Vogt 1990). The HED was listed as state-endangered in Illinois in 1991 (Illinois Administrative Code 1992, Illinois List of Endangered and Threatened Fauna, 17 IAC 1010. 1992, Illinois Register 16 (1):107), listed as federally endangered in January 1995 (USFWS 1995), and a Recovery Plan was published in September 2001 (USFWS 2001). The species also is listed as state-endangered in Ohio, Michigan, Missouri, and Wisconsin. The International Union for the Conservation of Nature (IUCN) also lists the HED as endangered (Moore 1997; USFWS 2001), and The Nature Conservancy lists this species as globally imperiled (USFWS 1995).

35 Based on the current population status and distribution and the continuing threats to the species and its habitat, the Hine's emerald dragonfly continues to be in danger of extinction throughout all or a significant portion of its range.

Threats

40 The principal threat to the HED in Illinois is habitat degradation and alteration. Residential and commercial development, mining, roadway and pipeline construction, landfills and filling of wetlands could reduce suitable habitat for the HED (USFWS 2001). Changes in surface and subsurface hydrology could adversely affect larval and breeding habitat by changing water temperature, flow, chemistry, and volume (USFWS 2005). Groundwater, which also drives wetland hydrology, could be impacted by various development activities, such as mining or use of municipal and private wells (GAS 2008; USFWS 2005). Other development activities that increase impervious surfaces and alter surface drainage patterns could also result in reducing the suitability of habitat or the loss of larval and breeding habitat (USFWS 2005). Contamination of groundwater or surface water from landfills, pesticides, road salts and other chemicals is also a concern (USFWS 2005). Transportation and roadways are also a threat to this species, both from direct mortality and from habitat destruction or fragmentation. Adult HED mortality from direct impacts with vehicles or trains has been documented and may reduce the HED population sizes (Steffens 1997, 1998;

Soluk et al. 1998b; USFWS 2001; Soluk and Moss 2003). Land use practices, fire suppression and past agricultural development have also reduced available habitat as well as the abundance of insects for prey across its range.

- 5 In addition to the above threats to the HED in Illinois that are covered in the species Recovery Plan (USFWS 2001), the U.S. Fish and Wildlife Service and their partners have learned about additional threats since the Recovery Plan was issued and these are described below.

Invasive Species Threat

- 10 The Hine's emerald dragonfly Recovery Plan identified the need for studies to evaluate the short and long-term responses of larvae and adult HED to habitat management practices including non-native species control. This is an on-going need as invasive species continue to threaten the Hine's emerald dragonfly and its habitat.

- 15 Invasive vegetation can potentially impact Hine's emerald dragonfly behavior and habitat. The encroachment of cattails (*Typha* spp.) and woody vegetation has the potential to affect adult HED flight behavior and movement. Mierzwa (2008) suggests that adult HED breeding habitat is being encroached upon by the accumulation of layers of cattail thatch at marshes in Illinois sites that have not been maintained by continued prescribed fire; heavy thatch may restrict adult HED access to
20 breeding streamlets and limit larval presence through shade-induced reductions in productivity. During HED habitat assessment and adult surveys conducted in the Upper Peninsula of Michigan, observers found that utility right-of-ways that are kept clear of woody vegetation appear to serve as flight corridors (D. Soluk, pers. comm. 2012). In addition, observations of HED adults in Missouri revealed that the species will not fly more than 100 meters (328 feet) into closed canopy forest (T.
25 Vogt, Missouri Department of Natural Resources, pers. comm. 2007). It is likely that decades of fire suppression have allowed woody vegetation to encroach upon Ozark fen communities and closed-in areas that served as corridors to movement.

- Other invasive plant species can impact habitat features that help fulfill life history requirements.
30 For example, a necessary component of larval habitat is groundwater. Encroachment of woody invasive species in upland areas has the potential to allow greater runoff of precipitation and loss of subsurface water through evapotranspiration (Parish and Sellar 2006).

- Herbaceous invasive species can also impact necessary breeding habitat features. For example,
35 common reed (*Phragmites australis*) is believed to displace crayfish (D. Soluk, pers. comm., 2009), and hence their burrows that serve as refugia for HED larvae, possibly due to the thick rhizomatous mat that develops in monocultures of the species. At the River South Parcel, no crayfish, burrows, or HED larvae have been found within monotypic stands of common reed (Mierzwa, pers. comm. 2013). Preliminary study results from research being conducted at the Meissner Preserve in Door
40 County, Wisconsin, indicates that crayfish burrow numbers decrease with increasing density of reed canary grass (D. Soluk, pers. comm., 2013).

Barriers to Movement

- 45 Since the Recovery Plan was written, new information has been gained on barriers to adult HED movement. These barriers to movement can affect dispersal and flight behavior that may lead to isolated populations and increase the vulnerability of HED to effects from demographic and genetic stochasticity. The long-term viability of any species is based on a combination of population size and genetic diversity that are essential to counteract stochastic or catastrophic events.

Fragmentation or barriers to movement can lead to reduced population sizes and/or a loss in genetic

diversity. Barriers to movement that may lead to fragmentation include closed canopy forest and bridges.

5 Observations of adult HED flight behavior around the Interstate 355 (I-355) bridge that extends
over the Des Plaines River Valley in Illinois were made before and after bridge construction (Soluk
et al. 2011, p. 14). Research has shown a decrease in observed adult HED activity beneath the
bridge since the completion of the bridge deck, with adults avoiding the area underneath the bridge.
In general, dragonflies were often observed flying towards the bridge, quickly increasing flight
10 height to deck level, and then crossing at or near traffic height. In 2011, of the eleven possible
HEDs observed, three flew directly over the bridge, and none flew under it; the remaining
individuals did not attempt to cross the bridge. At this time, it is unclear what causes the various
flight behaviors observed or what other bridges may serve as barriers to movement. Methods to
mitigate this impact are being assessed. Preliminary studies were initiated in 2012 to observe
15 specific aspects of HED flight behavior around barriers and to assess the potential to discourage
road crossing with various mitigative measures (e.g. planted vegetation, netting, etc.) (D. Soluk,
pers. comm., 2012). Observations at the I-355 bridge during 2014 indicate that the presence of
white cloth directly under the bridge did not increase flight activity under the bridge (Soluk *et. al.*
2015). Separate experiments conducted from 2012 to 2014 in Door County, Wisconsin indicate that
20 diversion netting deters HED from attempting to cross roadways (Soluk *et. al.* 2014, 2015) and that
decreasing vehicle speed would reduce HED mortality during road crossings (Furness 2014; Soluk
et. al. 2015).

All-Terrain Vehicles

25 All-terrain vehicles (ATVs) have caused impacts to wetland vegetation and rivulets in Hine's
emerald dragonfly breeding habitat. A year after HED larvae were found at Blue Flag Fen in
Missouri, extensive damage from an ATV trail and associated rutting had altered the hydrology of
the fen, resulting in surface water at the site becoming reduced and confined (Walker and
Smentowski 2005). Damage from ATV activity was reported at rivulet 2N in Lockport Prairie
Nature Preserve in Illinois (Soluk 2008). The rivulet was damaged when deep (up to 40 centimeters
30 (15.75 inches)) ruts caused by an ATV led to altered flow paths for this stream channel, with the
channel moving as far as 16.5 ft. (5 m) off of its previous configuration. Extensive down-cutting
through organic soils was observed, as well as heavy silt deposition with dead adult crayfish
embedded in the silt. Moore (2005) and Vogt (2005) recommended using fencing, planted
vegetation, or 'shot rock' as a barrier to ATV encroachment.

USFWS HED Recovery Plan

35 The objective of the USFWS HED Recovery Plan is to assure the long-term viability of the HED
populations (USFWS 2001). When this is achieved, the HED may be removed from the federal list
of endangered and threatened wildlife and plants. One of the main goals of this HCP is to positively
40 contribute to the objective of the USFWS HED Recovery Plan. The USFWS HED Recovery Plan
provides criteria for reclassifying the HED from endangered to threatened and criteria for removing
the HED from the federal list (e.g. delisting). The criteria for delisting are provided below.

45 Goals of the USFWS HED Recovery Plan:

The Hine's emerald dragonfly will be considered for delisting when all of the following criteria are
achieved:

1. Each of the two Recovery Units contains a minimum of three populations composed of at least three subpopulations. Each HED subpopulation contains a minimum of 500 reproductive adults for 10 consecutive years.
2. Within each subpopulation, there are at least two breeding habitat areas, each fed by separate seeps and/or springs.
3. For each population, the habitat supporting at least three subpopulations should be legally or formally protected and managed for Hine's emerald dragonfly, using long-term protection mechanisms such as watershed protection, deed restrictions, land acquisition, or nature preserve dedication. In addition, mechanisms protecting the up-gradient groundwatershed will also be in place within five years.

The USFWS HED Recovery Plan identifies three potential subpopulations in Illinois. The USFWS' Biological Opinion for the I-355 South Extension identifies ten habitat sites in the lower Des Plaines River Valley that make up the Illinois population and together function as a metapopulation (USFWS 2005). Two of these sites, FPDWC's Lockport Prairie and HMS' River South property, contain the largest HED subpopulations in the state.

The HED 5-year review (USFWS 2013) also identifies three Illinois subpopulations, and includes habitat sites documented since the Recovery Plan. The 5-year review characterizes the Illinois population as follows:

Illinois Subpopulation 1: Lockport Prairie Nature Preserve, River South Parcel, Middle Parcel, Romeoville Prairie, Long Run Seep Nature Preserve, and Long Run/ComEd Parcel. Although not stated, foraging activity at non-breeding sites such as River Parcel and Dellwood Park West would be included as part of this subpopulation. HED movement is documented between all of the sites on the west side of the Des Plaines River on the basis of either marked animals or observations of animals midway between the sites (Mierzwa et al. 1995; Mierzwa et al. 2010). Cross-river movement remains undocumented at this time but is inferred by daily presence at Dellwood Park West immediately across the river from Lockport Prairie. The Long Run complex of sites is believed to be largely supported by breeding at Long Run Seep Nature Preserve and possibly to a lesser extent on the Long Run Parcel; the connection with the other sites is inferred but undocumented at this time.

Illinois Subpopulation 2: Keepataw, Black Partridge, and Waterfall Glen. The sites are contiguous and movement is documented for the first two and inferred for the third site. Important breeding sites are known at Keepataw and Waterfall Glen, and both have added potential habitat as a result of recent restoration projects. However, the recently constructed I-355 extension bridge over the Des Plaines River Valley may act as a barrier to movement that may fragment this subpopulation and the Illinois population.

Illinois Subpopulation 3: Cherry Hill Woods, McMahan Fen, and Palos Fen. Only McMahan Fen is known to support breeding at this time, and only in a single streamlet. The other two sites (located outside of the CHUs) are based on single adult HED observations. The three sites are in reasonably close geographic proximity but are not contiguous, and movement is probable (there are few major barriers to movement) but undocumented at this time.

Addressing USFWS HED Recovery Plan Goals

HMS' HCP will contribute to each of the goals (criteria for delisting) of the Recovery Plan. The Planning Area for this HCP includes all of the habitat areas of Subpopulation 1, which is by far the
HMS HCP *February 3, 2021*

largest and most important subpopulation of the Illinois population. This HCP includes measures to protect, enhance and restore, and preserve many of the habitat areas for this subpopulation. How these measures specifically address each of these goals is described in Section 5.1.2.

5 *Blanding's turtle*

Species Description

The Blanding's turtle is medium-sized (up to 24 cm (9.4 in)) with a domed, smooth, dark carapace speckled with small, pale, yellow spots. The most distinguishing characteristics are the bright yellow coloring on the underside of its neck, a notched upper jaw, and a hinged plastron. The plastron is yellow with large dark blotches on the edge of each plastral scute, but in older turtles, the entire plastron may be black. Males are larger than females, have longer tails with the cloacal opening located behind the edge of the carapace, concave plastrons for mating, and a dark upper jaw. Females have a shorter tail with the cloacal opening located at the edge of the carapace, a flat plastron, and some light striping on their upper jaw (Kipp 2000).

Habitat and Life History

The Blanding's turtle is a semi-aquatic species that spends most of its time in wetland habitat but moves long distances over land to reach nesting locations or to move between wetland complexes. The home range of turtles studied at Chain of Lakes State Park (Lake and McHenry Counties, Illinois) have been found to be up to 2.3 ha (5.68 ac) (Rowe and Moll 1991), while at Lockport Prairie (Will County, Illinois) juveniles were found to have a home range of 4.98 ha (2.06 ac), females 12.74 ha (31.48 ac), and males 10.59 ha (26.17 ac) (Banning et al. 2006). The Blanding's turtle habitat includes the clean waters of marshes, ephemeral wetlands, vegetated ponds, wet prairies, sedge meadows, oxbows, fens, and slow-moving waters in sloughs and rivers. Adjacent uplands containing open grasslands or old fields in sandy soils are commonly used as nesting habitat. Blanding's turtles are primarily carnivorous, feeding on crayfish, snails, insects, crustaceans, worms, small fish, frogs, and aquatic plants. The turtle is a long-lived species; individuals require 14 to 21 years to reach sexual maturity and can live up to 75 years. Blanding's turtle typically have high adult survival rates, but low reproductive success and small clutch sizes. Females nest in late May and June and may lay one clutch of 3-17 eggs. Nests are often depredated by raccoons, foxes, skunks, domestic dogs, and other small mammals. Reproductive success, as well as the survivorship of juvenile and adult turtles, is important for maintaining stable populations of this long-lived species (Congdon et al. 1983; Congdon et al. 1993). The turtles winter most often underwater, partially buried in soft substrate.

Range and Location

The Blanding's turtle range is concentrated in the Great Lakes region, extending from southern Ontario and northwestern Pennsylvania, through Ohio, Indiana, Michigan, Illinois, Wisconsin, and southern Minnesota and is found in Nebraska, Iowa, and extreme northeastern Missouri.

Figure 10 in Appendix A shows the parcels with known recent (2002-2014) Blanding's occurrences in the Planning Area. This figure shows that the Blanding's turtle has been found recently in a number of parcels throughout the Planning Area including Lockport Prairie, Romeoville Prairie, HMS' Middle, North, Far North, and River North Parcels and the adjacent ComEd ROWs and HMS' Long Run and ComEd Parcels. In addition, River South and River Parcels contain suitable habitat for Blanding's turtles. Until 2015, Lockport Prairie and Romeoville Prairie were the only sites within the Permit Area where formal studies and surveys had been conducted (Dreslik et al.

2005; Banning et al. 2006; Banning & Dreslik 2010). In 2015 Feng and Dreslik (2015) conducted a survey of Blanding's and spotted turtle on a number of HMS' parcels within the Permit Area.

Studies and Surveys within the Planning and Permit Areas

5 In Lockport Prairie, 42 Blanding's turtles are estimated to occur (Banning et. al 2006). A Population Viability Analysis (PVA) conducted in 2006 showed that over the next 50 years the LPNP population of Blanding's turtles has a 27.5% chance of extinction and is currently experiencing a negative growth rate (Banning et al. 2006).

10 Blanding's turtle has been found on HMS' parcels a number of times in the past few years. In the spring of 2015, the Illinois Natural History Survey (INHS) captured six juvenile Blanding's turtles on Middle Parcel, one hatchling on River North Parcel, and three adults and one juvenile on ComEd Parcel (Feng and Dreslik 2015). Prior to this, presence on Middle Parcel was inferred based on
15 three adult turtles observed crossing the access road north of Middle Parcel, one in the late 1990s, one in June 2011, and one in June 2013 (Mierzwa, unpublished field notes). The turtle observed in 2013 was entering North Parcel, and the other two were headed toward Middle Parcel. In April 2012, a Blanding's turtle was found in the southeast corner of ComEd Parcel along the access road that runs along its boundary with Long Run Parcel, and another was found in May 2014 in the
20 northeast corner of Long Run Parcel near a crude oil cleanup area (J. Mengler, pers. comm., 2014). In 2009, INHS conducted a turtle study in Romeoville Prairie during which time a female Blanding's turtle was radio tracked to the Far North Parcel, south of the preserve (Banning and Dreslik 2010). While tracking this female, another female and juvenile Blanding's turtle were found in the same area and tracked to River North Parcel. In addition, a gravid female Blanding's turtle was found dead on the east shoulder of Rt. 53 near the southwest corner of Far North Parcel in 2008
25 (Banning and Dreslik 2010). Prior to these sightings, the last observation of a Blanding's turtle on HMS property was reported about 20 years ago (Mierzwa 1996). A single adult Blanding's turtle was also observed crossing the road east of the existing quarry, near the southeast end of Middle Parcel in 1994, and a juvenile Blanding's was observed on River South Parcel in 1995.

30 *Conservation Status*

The Blanding's turtle was listed in Illinois as a state threatened species in 1999 (Dreslik and Philips 2006) and changed to state endangered in 2009 (IESPB 2009) because it was formerly wide-spread but was nearly extirpated from Illinois due to habitat destruction, collecting, or other development pressures (IESPB 2012). Blanding's turtle was petitioned in 2012 for federal listing (CBD 2014). A
35 90-day "substantial" finding was published by USFWS on July 1, 2015, indicating that listing may be warranted for the Blanding's turtle (after further review). The IUCN (2014) listed the Blanding's turtle as endangered in 2013 due to its extensive, slow decline in population size.

40 Although Blanding's turtle has become one of the most well-studied species of freshwater turtle in the U.S., studies to date are strongly site-specific and of limited spatial and temporal scale. Data on range-wide population dynamics and viability remain scarce (Congdon et al. 2008); therefore, it remains difficult to make range-wide statements on long-term viability.

45 Most populations are small, scattered, and disjunct. Large populations are known in only a few locations range-wide. The largest population is in Nebraska, with an estimated 130,000 individuals, or 20-57 turtles per hectare (Congdon et al. 2008).

In Illinois, the Blanding's turtle was formerly widespread, but at the time of listing (1999) was considered to have been nearly extirpated from Illinois due to habitat destruction, over-collecting,

or other pressures from the development of the state (IESPB 2012). As early as the late 1800s, researchers began noticing the Blanding's turtle disappearance from the prairie wetlands of Illinois (Congdon et al. 2008). The Blanding's turtle was likely historically more wide-spread throughout Illinois, primarily throughout the northern third of the state, but today the species' range is limited to northern and northeastern Illinois in localized, small, often isolated sub-populations. The highest concentration of Blanding's turtles occurs in northeastern Illinois, interestingly coinciding with the highest human populations within the state (McHenry, Lake, Kane, Cook, DuPage, and Will Counties). A combination of factors may explain this, including the highest historic population density in this region of Illinois relative to the rest of the state, plus the presence of a significant number of parks and preserves in this region as compared to that in the rest of the state, which is largely cropland (IESPB 2013).

NatureServe (2014) estimates that the short-term trend for the global, range-wide population spans from relatively stable to an expected decline of 30%. The long-term trend for the species is an anticipated global decline of 30-50%. According to NatureServe, the range-wide conservation status of Blanding's turtles is as follows:

- S1 (Critically Imperiled) – Missouri, New Hampshire, Pennsylvania, South Dakota, Nova Scotia, Quebec
- S2 (Imperiled) – Indiana, Maine, Massachusetts, Minnesota, New York (S2/S3), Ohio
- S3 (Vulnerable) – Illinois, Iowa, Michigan, Wisconsin (S3/S4), Ontario
- S4 (Apparently Secure) – Nebraska

The U.S. state listings for Blanding's turtles are as follows (sources: state DNR and Fish and Game sites):

- State Endangered (protected from take) – Illinois, Indiana, Maine, Missouri, New Hampshire
- State Threatened (protected from take) – Iowa, Ohio, Massachusetts, Minnesota, New York,
- State Special Concern (protected from collecting/poaching) – Michigan, Wisconsin,
- State Candidate (status currently under review) – Pennsylvania
- Unlisted – Nebraska, South Dakota

In Canada, the Blanding's turtle is federally endangered in Nova Scotia and federally threatened in Ontario and Quebec.

Threats

Major threats to the species include road mortality (from both road crossings and attempted nesting along gravelly roadside edges), development of upland nesting habitat, wetland degradation and loss, habitat fragmentation, egg predation by over-abundant predators (e.g. raccoons), collecting for the pet trade, and inherent factors such as delayed sexual maturity and low fecundity. Wetland degradation and loss is not limited to direct wetland impacts. Indirect impacts such as water level draw-down and pesticide drift from adjacent crops into wetlands can also lead to Blanding's turtle mortality (WDNR 2006; Congdon et al. 2008).

Addressing Blanding's Turtle Recovery Goals

The Blanding's turtle is not currently federally listed, and thus a federal Recovery Plan has not been prepared for the species. The Blanding's turtle is state-listed in Illinois; however, the Illinois DNR

has no current plans to develop a state-wide recovery plan. The Illinois Endangered Species Protection Board (IESPB) and IDNR had intended in 2012 to develop a recovery plan for the Blanding's Turtle, but were not able to complete that effort. Currently, there is no plan or schedule to work on a state-wide recovery plan for the species. The IESPB and IDNR jointly developed a Conservation Assessment document for internal conservation planning and recovery strategies, but it has not been approved and released for public use because some of the guidances may not conform to state endangered species laws without special permitting (i.e. captive breeding and reintroduction) (IESPB 2013).

10 *Potential Blanding's turtle habitat*

Blanding's turtles have been found throughout much of the Planning Area with recent documented occurrences in all of the HED Critical Habitat Units (CHUs 1-3 & 7) (Figure 10). Findings in recent years indicate that Blanding's turtle is more widespread in the lower Des Plaines River Valley than previously thought. This may be in part due to their long travel distances (Banning et. al. 2006) and indicates that suitable habitat is present in much of the Permit and Planning Areas. Figure 12 in Appendix A shows the mapped potential habitat of Blanding's turtles, on HMS' properties within the Permit Area. Table C-4 in Appendix C shows the habitat rankings for Blanding's turtle's potential use of HMS' properties based on vegetation mapping. Table C-5 shows the acres of high, moderate, and low ranked potential habitat for Blanding's turtle on each HMS parcel within the Permit Area. Only 29.14 acres of moderate or high-ranking potential Blanding's turtle habitat is found in Middle Parcel. This consists of cattail and *Phragmites* dominated marsh, wet-mesic dolomite prairie, and old-field vegetation (Table C-4). Most of the parcel (95.75 acres) has been disturbed in the past (e.g. filled or scraped), and these areas are considered low potential habitat. In addition, barriers to access to the site also limit the turtles' use of the parcel.

25 *Spotted turtle*

Species Description

The spotted turtle is a small turtle (up to 12 cm (4.7 in)) with a smooth, broad, dark carapace dotted with small yellow spots. The head is spotted or uniformly dark and the limbs are dark above and yellow to orange below. The plastron is not hinged. It is yellow or orange with a black blotch covering a portion of each scute. In some males or older females, the black pigment may cover nearly the entire plastron. Mature males usually have a tan chin, brown eyes, a slightly concave plastron, and an elongated and compressed carapace. Mature females have a yellow or orange chin, orange eyes, a flat plastron, and a rounder carapace (Ernst et al. 1994).

Habitat and Life History

The spotted turtle is a semi-aquatic species that spends most of its time in wetland habitat, but often moves into uplands as it travels between wetland complexes or to aestivate. Spotted turtles are known to aestivate on land or in aquatic habitats for long periods during times of drought and during the warmest times of the summer. Spotted turtles inhabit shallow vegetated wetlands with a soft substrate, including shallow marshes, sedge meadows, cattail marshes, and wet dolomite prairies. Females nest in open, sunny locations with moist, well-drained soils in sedge meadows and wet prairies. Turtles winter in muskrat or other small mammal burrows or in shallow water in the soft organic substrate. Spotted turtles are omnivorous, feeding on crayfish, worms, snails, insects, crustaceans, aquatic plants, and algae. They are a long-lived species, requiring 7 to 14 years to reach sexual maturity (Ernst et al. 1994). Females nest from May to July and may lay one clutch of 3-5 eggs. Spotted turtles studied in Lockport Prairie in the Des Plaines River Valley had home

ranges that averaged between 2.59 ha (6.4 ac) (females) to 5.26 ha (13.0 ac) (males) (Banning et al. 2006). Common predators include raccoons and muskrats (Harding 1997).

5 *Range and Location*

Nationally, the spotted turtle range is concentrated in two main areas: the Great Lakes region and along the eastern seaboard. The Great Lakes region extends from northeastern Illinois into the western and southern lower peninsula of Michigan, northern Indiana and Ohio, western Pennsylvania, and southern Ontario (Wilson 1994). In Illinois, the spotted turtle is limited to the lower Des Plaines River Valley. Figure 11 in Appendix A shows the parcels within the Planning Area with known recent spotted turtle occurrences. These include only Lockport Prairie and Romeoville Prairie. However, like the Blanding's turtle, suitable habitat occurs in the Planning Area outside of these preserves.

15 *Studies and Surveys within the Planning and Permit Areas*

The first formal spotted turtle survey was conducted on HMS properties by the INHS in spring 2015, but no spotted turtles were found. Surveys have also been conducted in surrounding nature preserves, and spotted turtles have been documented in both Romeoville Prairie Nature Preserve and Lockport Prairie Nature Preserve (Anthonysamy 2012; Banning et al. 2006). At the time of the study, Lockport Prairie was believed to support a population of 81 spotted turtles, or 2.2 per hectare (Banning et. al 2006). No estimate was calculated for Romeoville Prairie, but the population is believed to be considerably smaller.

During HED survey work conducted since 1994, incidental observations of turtles were noted. No spotted turtle was ever observed within HMS property, though several other species were encountered, including Blanding's turtles (Mierzwa, unpublished field notes). Spotted turtles appear to be more ecologically-constrained than Blanding's turtle, requiring higher quality marshes and sedge meadows than that which Blanding's turtles will tolerate. In addition, unlike Blanding's turtles, spotted turtles will not use larger rivers such as the nearby Des Plaines River for dispersal (Anthonysamy 2012; Banning et al. 2006). To date, it is presumed that spotted turtles do not occur within the HMS properties, and those present within the surrounding nature preserves are remaining onsite and not migrating into the lower-quality habitats available within the HMS Permit Area.

Conservation Status

35 The spotted turtle became listed as a state endangered species in Illinois in 1977 due to restricted habitats or low population levels in Illinois (IESPB 2012) and was petitioned in 2012 for federal listing (CBD 2014). A 90-day "substantial" finding was published by USFWS on July 1, 2015, indicating that listing may be warranted for the spotted turtle (after further review).

40 The spotted turtle is considered a critical species for state conservation according to the Illinois Comprehensive Wildlife Conservation Plan (IDNR 2005). A critical species is defined in the previously referenced plan as "Illinois' species in greatest need of conservation that need to be managed within the natural division, if they are to be effectively conserved in Illinois."

45 The spotted turtle was listed in the IUCN red list as endangered in 2013 (IUCN 2014). The IUCN states that over that past 25 years, the spotted turtle has likely sustained a 50% reduction in range-wide population size due to mortality factors such as road collisions, illegal collecting, habitat loss, and predation.

5 Range-wide, spotted turtle populations are scattered, localized, and disjunct, with numerous local populations ranging from a few individuals upwards to an occasional population of over 1,000 individuals. Great Lakes populations appear to be most at-risk, but eastern populations recently appear to be in trouble as well. Range-wide habitat and population studies are limited, but most studies agree that overall, the species may be in decline (CITES 2013, and references therein).

10 In Illinois, the spotted turtle has always had a limited distribution and is believed to have historically occurred only within the northeastern counties, particularly within the marshes and wet prairies of what later became the greater Chicagoland area (Cook County). For years, the spotted turtle was feared extirpated from Illinois until three populations were discovered in Will County in the early 1980s along the Des Plaines River. One population is located on private land and faces development pressure and the remaining two are protected in Illinois Nature Preserves. No spotted turtles have been found in Cook County since the early 1950s (Dreslik et al. 1997). Today the species appears to be limited to Will County (INHS 2004).

15 Nature Serve (2014) estimates that the short-term trend for the global, range-wide population spans from relatively stable (e.g. southern New England) to an expected decline of 30%. The long-term trend for the species spans from a possible global population increase of 10-25% to a decline of 30%, depending on location. According to Nature Serve, the range-wide conservation status of spotted turtles is as follows:

- S1 (Critically Imperiled) – Illinois, Vermont, District of Columbia, West Virginia, Quebec
- S2 (Imperiled) – Indiana, Michigan
- 25 • S3 (Vulnerable) – Ohio, Maine, New Hampshire, Delaware, New Jersey, New York, Pennsylvania, North Carolina, Georgia, Florida, Ontario
- S4 (Apparently Secure) – Connecticut, Massachusetts, Virginia
- S5 (Secure) – Maryland, Rhode Island, South Carolina

30 The U.S. state-listings for spotted turtles are as follows:

- State Endangered (protected from take) – Illinois, Indiana, Maine, Vermont
- State Threatened (protected from take) – Michigan, Ohio, South Carolina
- State Special Concern (protected from collecting/poaching) – New York, Pennsylvania, New Hampshire
- 35 • Unlisted – Massachusetts, Connecticut, Delaware, New Jersey, Rhode Island, Maryland, Virginia, West Virginia, North Carolina, Georgia, Florida

In Canada, the spotted turtle is federally endangered in Ontario and Quebec.

40 *Threats*

The greatest threats to the spotted turtle are habitat loss and fragmentation due to invasive plant species changing the structure of wetland communities, changes in hydrology, urban development, and collection for the pet trade industry. Spotted turtles are also vulnerable to predation by over-abundant predators such as raccoons. In addition, spotted turtles appear to be poor dispersers; new habitat opportunities are unlikely to be colonized, and isolated populations are unlikely to find each other. Delayed sexual maturity and low fecundity also limit population growth of the species (Harding 1997; Harding 2013).

Addressing Spotted Turtle Recovery Goals

The spotted turtle is not currently federally listed, and thus a federal Recovery Plan has not been prepared. The spotted turtle is state-listed in Illinois, but currently there are no plans to develop a state-wide recovery plan.

5

Potential Spotted Turtle Habitat

Spotted turtles, thus far, have been found in two nature preserves in the Planning Area (Figure 11) and, like the Blanding's turtle, suitable habitat occurs outside these preserves. Figure 13 in Appendix A shows the mapped potential habitat of spotted turtles on HMS' properties within the Permit Area. Table C-4 in Appendix C shows the habitat rankings for spotted turtle's potential use of HMS' properties based on vegetation mapping. Table C-5 shows the acres of high, moderate, and low ranked potential habitat for spotted turtle on each HMS parcel within the Permit Area. Only 29.14 acres of moderate or high ranking potential spotted turtle habitat is found in Middle Parcel. This consists of cattail- and *Phragmites*-dominated marsh, wet-mesic dolomite prairie, and old-field vegetation (Table C-4). Most of the parcel (95.75 acres) has been disturbed in the past (e.g. filled or scraped), and these areas are considered low potential habitat. However, based on limited confirmed occurrences of spotted turtle in the area and their limited mobility, it is unlikely that they use the parcel (see Section 5.2.4).

20 **2.2.2 Plant Species of Concern**

These species are included in the HCP, but no federal ITP or state ITA is being sought for these because they are not required for plants. There are no Federal prohibitions under the Endangered Species Act for the take of listed plants on non-Federal lands, unless taking of those plants is in violation of State law. However, before the U.S. Fish and Wildlife Service issues a permit, the effects of the permit on listed plants must be analyzed because Section 7 of the ESA requires that issuance of an Incidental Take Permit must not jeopardize any listed species, including plants.

Leafy Prairie Clover

30

Species Description

Leafy prairie clover (LPC) is easily distinguished from most other species of the genus east of the Mississippi River on the basis of the leaflet number, which ranges from 9 (Barneby 1977) to 31 (Gleason and Cronquist 1963) but typically is between 20 and 27 (Fernald 1950). Leafy prairie clover is a glabrous, stout, perennial herb, with one to several stems 20 to 80 cm (8 to 31 in) long arising from a hardened root crown. Leaves are alternate and oddly pinnately compound. Flowers have a lavender-purple calyx with five petals. Flowers grow on dense conic to cylindrical heads that are between 0.4 and 8.9 cm (0.15 to 3.5 in) long and 0.6 to 1.0 cm (0.24 to 0.4 in) wide (DeMauro and Riddle, unpublished data) with short peduncles, 0 to 2 mm (0 to 0.08 in) long.

40

Life History

LPC is a short-lived herbaceous perennial that has no capacity for vegetative spread (Baskin and Baskin 1973; Schwegman and Glass, unpublished data). In March, new ramets (stems) begin to grow from buds on the root crown just below the soil surface. By July, these ramets are 40 to 65 cm (15.7 to 25.6 in.) tall (Baskin and Baskin 1973). A single ramet will develop one or more inflorescence buds in late June. Flowering begins in late July, peaks in mid-August, and can continue until late August. Flowers are hermaphroditic and protandrous (Wemple 1970). LPC seeds ripen by early October and disperse from the erect dead ramets from late fall to early spring (Baskin and Baskin 1973). Potential dispersal vectors include wind, gravity, birds, and small mammals.

Dormant seeds are capable of forming a persistent seed bank. Seeds from Illinois populations readily germinate without scarification (R. Betz, Northeastern Illinois University, pers. comm., 1992). Germination occurs in April and by late May the seedlings have several leaves (Baskin and Baskin 1973). Spring fires appear to stimulate germination and establishment, possibly by the
5 removal of accumulated duff and subsequent creation of more openings in which buried seeds can germinate and survive.

Habitat

10 Leafy prairie clover is found only in open limestone cedar glades, limestone barrens, and dolomite prairies that have shallow, silt to silty-clay loam soils over flat and often highly fractured limestone with frequent expanses of exposed bedrock at surface elevations typically between 168 and 213 m (550 and 700 ft). These habitats experience high surface and soil temperatures, generally have low soil moisture, are wet in the spring and fall, and become dry in summer (Quarterman 1989; DeMauro 1986; White 1978).

15 Although LPC plants can persist in partial shade, the species' preferred habitat is open sun with a soil depth from 4 to 45 cm (1.6 to 17.7 in) (DeMauro, unpublished data; Baskin and Baskin 1973), but is most abundant in 10 to 30 cm (3.9 to 11.8 in) of soil. LPC occurs in the relatively mesic and wet-mesic portions of the soil moisture gradient, typically in association with dry washes. The wet-mesic component is probably critical to population persistence, particularly in drought years. Leafy
20 prairie clover may be reduced or excluded from areas supporting dense perennial grasses or woody vegetation due to competition and shading (Quarterman 1989; Smith and Wofford 1980).

Range and Location

25 The center of the LPC range is the limestone cedar glades of central Tennessee and northern Alabama, where the species is considered likely endemic (Baskin and Baskin 1973). The Illinois population is disjunctive, where it is now restricted to dolomite prairies on river terraces in the northeastern part of the state (Kurz and Bowles 1981). Several leafy prairie clover populations have been monitored in properties containing appropriate mesic to wet-mesic dolomite prairie habitat
30 within and outside the Planning Area. These include Lockport Prairie Nature Preserve, Romeoville Prairie Nature Preserve, Lockport Prairie East, Keepataw Preserve (FPDWC 2012), and HMS' ComEd Parcel (Radke et al. 2004a, 2004b) (Figure 14, Appendix A). LPC is also found in two other locations within the Planning Area: Long Run Parcel and Dellwood Park West Nature Preserve which is located immediately south of Lockport Prairie East (Figure 14, Appendix A).
35 Outside the Planning Area, a natural population also is found at Midewin National Tallgrass Prairie, and introduced populations are found at Des Plaines Conservation Area and Fabyan Forest Preserve (USFWS 2014a).

40 Table C-6 in Appendix C provides a summary of the monitoring results of population estimate and stem count surveys conducted by FPDWC staff for Romeoville Prairie, Lockport Prairie, Lockport Prairie East, and Keepataw Preserves (FPDWC 2012). This table also includes the number of plugs that were planted in Lockport Prairie East, Romeoville Prairie, and Keepataw Prairie which began in 2008. It is important to note that prior to 2007 the district counted all plants at each site and after 2007 the district created plots and counted plants located within each plot. HMS consultants (Radke
45 et al. 2004a, 2004b) conducted surveys for the LPC on HMS' ComEd Parcel. They estimated the population to be 290 plants in 2003 and counted 3,345 plants in 2004. Estimates from 2003 were based on the number of ramets counted with the assumption of 4 ramets per plant. In addition, USFWS collected LPC seed from ComEd parcel in 2006 and 2007. Although they were not conducting a population survey, they estimated the population to be greater than 1,000 plants in

both years (M. Redmer, pers. comm., 2012). Additional LPC populations have been found in ComEd Parcel since the surveys (AES 2012) and one has been found at the far north end of Long Run Parcel near ComEd Parcel (J. Mengler, pers. comm., 2011), but no stem counts or population estimates were conducted. No other populations are known to occur within the Planning Area.

5

Conservation Status

The leafy prairie clover was listed as federally endangered in 1991 (USFWS 1991). The species is listed as endangered in Tennessee (Somers et al. 1989) and Illinois (Illinois Endangered Species Protection Board 1990).

10

Threats

Threats to the leafy prairie clover include habitat loss, competing invasive species, shade suppression by woody species and fire suppression.

15

USFWS Leafy Prairie Clover Recovery Plan

A Recovery Plan exists for the leafy prairie clover (USFWS 1996). The goal of the plan is delisting of the species. The recovery strategy includes enhancement and maintenance of population viability through habitat protection, management and population restoration. Delisting for the Illinois population will occur when a minimum of three populations ranked as having high viability are protected and managed for 10 consecutive years.

20

USFWS Leafy Prairie Clover Recovery Plan Goals

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1. Identify and prioritize protection, management and restoration needs for all viable populations for each geographic region. The USFWS Leafy Prairie Clover Recovery Plan identifies Lockport Prairie, Romeoville Prairie, and Keepataw Forest Preserve. The populations on HMS' ComEd and Long Run Parcels were not known at the time the Recovery Plan was published.
2. Evaluate potential Illinois recovery sites. One site within the Planning Area is considered a high potential recovery site: Lockport Prairie East.
3. Initiate and complete preserve design and implement the protection and management required to meet recovery criteria.
 - a. Develop preserve designs with protection and management of leafy prairie clover as a priority.
 - 35 b. Implement protection by seeking the highest level of protection possible for a parcel (e.g. designation as an Illinois Nature Preserve).
 - c. Develop a management plan for a parcel and include leafy prairie clover.
 - d. Implement management plans, including prescribed burning, exotic species control, protection from overuse and illicit activities, and herbivore damage.
 - 40 e. Increase population through enhancement of current populations or establish new populations.
4. Develop and implement population monitoring programs.
5. Conduct research to enhance recovery efforts.
- 45 6. Develop materials to inform the public about the status of the species and USFWS Leafy Prairie Clover Recovery Plan objectives.

Addressing USFWS Leafy Prairie Clover Recovery Goals

HMS' HCP addresses the biological goals and objectives of the USFWS Leafy Prairie Clover Recovery Plan through avoidance and minimization measures and restoration, management, and protection of habitat.

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Lakeside Daisy

The Lakeside daisy (LD) was listed as federally threatened in 1988. The two known LD sites in Will County were established with 1,100 transplants into appropriate habitat in 1988 (Lockport Prairie Nature Preserve and Romeoville Prairie Nature Preserve). Populations at these sites continue with low to moderate success (USFWS 2010b). The USFWS issued a Recovery Plan for the species on September 19, 1990.

10

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This plant is found in dry, rocky prairie grassland underlain by limestone. It requires open sites with full sun. Although it grows in Great Lakes states and along the Canadian shore of Lake Huron, it is named for Lakeside, Ohio, near one of its best-known sites.

20

The final rule (53 FR 23742) listing LD as threatened identified the threats to the survival as habitat destruction, succession of overgrowth by woody species, over-collecting for gardens, inadequacy of existing regulatory mechanisms, and the species' self-incompatibility. The most significant threats range-wide are habitat destruction and succession of woody species.

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Lakeside daisy is a clump-forming, herbaceous perennial that produces solitary, daisy-like flowers on stout, hairy stalks. The leaves form dense basal rosettes that arise from a short, thick, branching base (caudex) with a similarly short, thick taproot. The narrow, one-nerved, dark green leaves, which may range to about 16 cm in length, are lanceolate (lance-shaped) to oblanceolate (narrower at the base), and in addition to being somewhat thick in texture, are strongly punctate (dotted with glands). Flowers are borne solitarily on relatively stout, softly hairy peduncles that elongate through the flowering period, ranging from about 10-40 cm in height when seeds are dispersed. The bright yellow, daisy-like flower heads, as in similar composites, are inflorescences composed of both disk (central) and ray (outer) florets, the ray florets 3-toothed on the margin. The fruits are small, top-shaped, hairy achenes. It is unlikely that flowering plants of Lakeside daisy would be confused with another species, particularly because there are very few early blooming composites and none that would even be superficially similar to this rarity (Penskar 2002).

35

According to USFWS Recovery Plan for the Lakeside daisy (*Hymenoxys herbacea*) (September 19, 1990):

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Disease and predation were not listed as threats to the Lakeside daisy at the time of listing (53 FR 23742), though herbivory was included as an ecological threat to both natural and restored populations in the Recovery Plan (USFWS 1990). Predation, namely deer and rabbit herbivory, of this plant has appeared to increase within the introduced populations in Lockport Prairie Nature Preserve and Romeoville Prairie Nature Preserve in Will County, Illinois (K. Lah, pers. comm. 2006). Alternatively, inflorescences at these sites have been found on the ground next to rosettes, indicating trampling by wildlife or internal parasites, i.e., cutworms or insects, within the plants (Juanita Armstrong, Natural Resource Land Manager, Forest Preserve District of Will County, Illinois, pers. comm. 2010). These factors pose a threat to Lakeside daisy populations since rosettes are not able to regenerate if herbivory on leaves is too intense (USFWS 1990), or if significant damage to the plants is caused by other sources.

- Lakeside daisy populations are also threatened by human use of the habitat, including ATV access, which can destroy plants and habitat. The population at Hiawatha National Forest/Stratton Memorial Nature Sanctuary in Mackinac County, Michigan is threatened by ATV access due to its close proximity to a public road ROW and a utility ROW (S. Huebner, pers. comm. 2009). Non-native invasive species, such as Oxeye daisy (*Leucanthemum vulgare*); Spotted knapweed, (5 *Centaurea stoebe*); and Smooth brome (*Bromus inermis*) are threatening Lakeside daisy with their introduction through ATV access (S. Huebner, pers. comm. 2008, 2009). To protect this population, regular maintenance is required to remove nonnative invasive species and woody encroachment.
- 10 Climate change may be a serious threat for a rare, endemic plant species like the Lakeside daisy. The habitat for the Lakeside daisy currently spans a narrow range of habitat types, including dry, limestone prairies and alvar communities, which are globally rare. According to regional precipitation and temperature models, increased temperatures and increased rainfall may alter the habitat for the Lakeside daisy in such a way that the plant cannot adapt, or invasive plants may encroach (Union of Concerned Scientists 2009). It is not known how the Lakeside daisy will be impacted by temperature or precipitation increases.
- 15

Addressing USFWS Lakeside Daisy Recovery Goals

- 20 HMS' HCP addresses the biological goals and objectives of the USFWS Lakeside Daisy Recovery Plan through avoidance and minimization measures. Lakeside daisy is not found on HMS' property and no impacts are expected from planned activities.

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3.0 PROJECT DESCRIPTION and ACTIVITIES

3.1 Project Description

5 HMS and its predecessor companies have been operating limestone quarries in the vicinity of
Romeoville in Will County, Illinois for more than sixty years. HMS' quarry and support operations
occupy over 1,400 acres at this location; it is one of the largest aggregate operations, in terms of
production, in the region. This facility is unique because it is the only regional limestone production
operation that can ship materials via truck, rail, and barge. Transporting limestone product by barge
10 provides numerous benefits to the local community and to the environment. It is safer than other
forms of transport, reduces traffic, improves air quality, and reduces carbon emissions. Therefore,
this facility is an important and economical limestone source for both local and regional markets.

HMS proposes to continue surface mining its two currently active quarries (Pierce Eich and Middle
15 Quarries) in its Romeoville facility, to expand surface mining into Middle Parcel, to expand surface
mining of the East Quarry north into East Parcel, and eventually to perform sub-surface mining of
Galena-Platteville limestone starting at a depth of approximately 350 feet below the surface
throughout its facility. HMS plans to nearly complete surface mining in its Pierce Eich Quarry
before resuming mining in Middle Quarry or starting mining in Middle Parcel (Figure 2 and 15.1,
20 Appendix A). Surface mining in the East Parcel is anticipated to start around the time of completion
of surface mining in the other parcels. All this surface mining is anticipated to be completed over a
period of approximately 35 years. However, all surface mining that will require an ITA or ITP
(Pierce Eich Quarry, Middle Quarry, and Middle Parcel) is anticipated to be completed in 30 years
therefore, HMS is seeking a 30-year permit. Mining East Parcel does not require an ITP or ITA.
25 Sub-surface mining will start prior to the completion of surface mining and may occur in
approximately 15 years. Associated mining activities (e.g. crushing, conveying, screening, and
stockpiling) will also occur during the permit term. These plans are explained in detail in HMS'
Mining Plan found in Appendix E and summarized in Section 3.2 below. In addition, HMS will
retain a small setback strip along the west side of North and Far North Parcels (350' back from
30 Route 53) for possible future development (see Figure 16).

Most importantly for purposes of this HCP, HMS proposes to conduct activities and implement
extensive measures that will avoid, minimize, and/or mitigate impacts to the Covered Species and
their habitats. These activities and measures are summarized in Section 3.2 below and described in
35 greater detail in Chapter 5 and the Restoration Plan Set (Appendix F).

3.2 Activities Covered by the Permit

According to the Mining Plan (Appendix E), HMS first will complete surface mining in Pierce Eich
40 Quarry. As of the end of 2019, an additional 35 acres was projected to be mined in this parcel by
2026 (Figure 15.1, Appendix A). As this mining is nearing completion, HMS will resume surface
mining in Middle Quarry (approximately 1 acre) and start surface mining in Middle Parcel. Mining
of Middle Parcel will start at the south end (from Middle Quarry) and progress generally in a
northerly direction. Mining will occur on approximately 115 acres of the 125-acre Middle Parcel
45 and is estimated to take approximately 20 years. In addition, HMS plans to surface mine 36 acres of
limestone in East Parcel located immediately north of the East Quarry. This area is part of the
mining operations and includes an old settling pond for the water used at the facility (no longer in
use) and mining product surge and stockpiles. This area contains no wetlands or Covered Species

habitat and will not require an ITP or ITA to mine. In total, HMS plans to surface mine 187 acres at the Romeoville facility.

5 While HMS does not plan to surface mine on the North and Far North Parcels (which will be preserved in perpetuity along with other parcels further described in Chapter 5), the company will retain a small setback strip along the west side of those parcels (350' back from Route 53) (see Figure 16) for possible future sale and development (e.g. commercial development). The setback areas on North and Far North Parcels are 6.49 and 10.65 acres, respectively. Both of these areas are old fill areas that have revegetated with old field vegetation and invasive shrubs and are much higher (10+ feet) than the adjacent wetlands to the east. They are marginal HED foraging habitat and low-quality turtle habitat. These areas are included in HMS' requested take due to the loss of HED habitat, including critical habitat. Any additional impacts during construction/operation of the site would be the responsibility of the owner/operator of the developed site.

15 Approximately 15 acres in Pierce Eich and nine acres of Middle Quarry that could be mined under the Illinois Mining Regulations will not be mined and will reduce potential groundwater impacts (Figure 15.2). This is an 11% (24 ac of 211 ac) reduction in HMS' potential surface mining area. In addition, surface mining of North Parcel (approx. 29 acres) and Spangler Property (approx. 61 acres), which were included or considered for inclusion in previous mining plans, are not a part of this mining plan. These two parcels, which would have increased the surface mining area by 48% (90 ac of 187 ac), were not added to the plan in order to prevent potential groundwater impacts. Thus, this HCP requires HMS to forego mining over 110 acres of property to ensure hydrological impacts are kept to a minimum.

25 The surface mining process requires removal of overburden material (i.e. soil and vegetation) prior to removing limestone along the quarry wall using explosives. Although mining (i.e. limestone removal) in Middle Parcel will not begin until approximately 2026, overburden removal will start within the first few years of the mining plan implementation. As an avoidance measure during the stripping (i.e. overburden removal) phase, the highest quality vegetation and habitat in Middle Parcel - the 6.01-acre wet dolomite prairie located in the central portion of the parcel, will be carefully salvaged and transplanted to a mitigation parcel (ComEd Parcel).

35 In approximately 15 years and before surface mining operations are complete at the Romeoville facility, HMS will begin sub-surface mining operations at the facility. Underground mining will take place in the Galena-Platteville formation located approximately 200 feet below the bottom of the quarries (approximately 350 feet below ground surface) and will occur under each of the three surface mined parcels included in this plan (during the permit period) as well as other HMS parcels (after the permit period). HMS plans to use the room and pillar method of extraction for its sub-surface mining.

40 In addition to the actual mining of limestone, other associated operations at the Romeoville facility, such as crushing, washing, and sizing of limestone; truck, rail, and barge loading; and other support activities, are required for processing and shipping the limestone. A marine operation and a maintenance shop also are located at the facility and will continue to operate for the duration of mining activities.

HMS also will undertake various, extensive habitat restoration and management activities that will be covered by the ITP and ITA. These activities will include, among others, cutting and applying herbicide to invasive shrubs and trees, applying herbicide to invasive herbaceous species, seeding

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- and planting native species, conducting prescribed burns, and discing and tilling soil in specific locations. In addition, a gravel road covering 0.39 acres and a number of temporary routes will be constructed through the ComEd Parcel and a small portion of Long Run Parcel for access during the wet dolomite prairie transplant and other restoration activities. The transplant will involve the
- 5 removal of fill material from the ComEd Parcel and placement of 6.01 acres of wet-mesic dolomite prairie from Middle Parcel into the ComEd Parcel. In addition, a number of measures will be taken to avoid or minimize impacts during these activities. These activities and measures are described in more detail in the mitigation sections of Chapter 5 and the Restoration Plan Set (Appendix F).
- 10 In addition to habitat restoration activities, HMS plans to implement a number of measures to avoid potential groundwater impacts to the HED and other Covered Species habitat, which have been developed after years of hydrological studies. These include the installation of infiltration galleries in the River South Bluff Parcel and creation of an infiltration pond on FPDWC property in the southwest corner of Route 53 and Renwick Road. These measures are discussed more in Chapter 5.
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4.0 ALTERNATIVE ANALYSIS

For a number of years, Hanson Material Service (HMS), has been exploring and evaluating several operational strategies for conducting business in the HCP Permit Area. HMS has explored strategies to minimize anticipated stresses to the Covered Species and their habitats from future mining. This section outlines the alternatives HMS considered, the preferred alternative chosen, and consequences associated with each.

HMS considered and analyzed a number of different mining plans that would reduce impacts to the Covered Species and/or designated Critical Habitat while meeting the company's need to continue surface mining at the Romeoville Quarry. These included surface mining various combinations of parcels at the Romeoville facility, subsurface mining, and surface mining at other quarry locations (the "no-action" alternative). Detailed economic, biological, and hydrological studies informed and guided the alternatives analysis process. Upon concluding this analysis, HMS determined that the alternatives would not achieve the purpose and need of this project and/or would be more detrimental to the Covered Species than the preferred alternative. Table C-7 (Appendix C) compares the potential impacts of surface mining each parcel included in this analysis and subsurface mining.

4.1 No-Action Alternative

Under the No-Action alternative, the HCP would not be implemented and USFWS would not issue the requested ITP. In other words, no activities that would result in "take" of Covered Species or modification of Critical Habitat (CH) would be conducted, no permit would be obtained, and no conservation or mitigation plan would be implemented.

No-action for HMS means very limited future surface mining and no subsurface mining at HMS' Romeoville facility. Because no ITP would be sought, an HCP would not be completed and no ecological restoration or management of HMS' other parcels that provide Covered Species habitat or potential habitat would occur. The only surface mining that would take place at the Romeoville facility, under the No-Action Alternative, would be in East Parcel (36 acres) at the north end of East Quarry. This area can be mined without a permit because no impact to the Covered Species or their habitat, including indirect groundwater impacts, can be ascertained as a result of this mining. This alternative would deprive HMS of the opportunity to quarry all but a very small amount of the remaining surface reserves in the Des Plaines River Valley. As a result, mining operations at the Romeoville facility would be limited to mining just East Parcel, which will likely be completed in approximately five years and the company would not be able to mine further until the Covered Species are no longer listed - unlikely to occur for decades. This would result in HMS losing 57 million tons of surface stone reserves and more than 300 million tons of subsurface reserves, which were acquired and, in most cases, permitted for mining prior to the listing of the Covered Species, costing the company millions of dollars in profit. Moreover, over 205 well-paying jobs would be lost and would severely damage the local economy.

Since this alternative includes very limited mining at the Romeoville facility (36 acres in East Parcel), the local area would have to be supplied largely with limestone from other quarries outside the region. The Romeoville area market, like many limestone markets, is a localized market, due in large part to the high cost of truck delivery. The typical truck delivery distance from the Romeoville facility to HMS customers is approximately 10 miles. The next closest HMS limestone location is the Federal Quarry in McCook, Illinois, approximately 20 miles from Romeoville. The increase in

delivery distance increases the delivered cost of the limestone to customers, meaning limestone for the Romeoville area could not be supplied economically from other HMS locations.

5 The Romeoville facility is unique because it is the only regional limestone quarry that can ship materials via truck, rail, and barge. Therefore, this facility is a critical limestone source for HMS serving both local and regional markets. Because of its location on the Chicago Sanitary and Ship Canal, limestone products can be shipped from this location on barges to distant customers. In fact, approximately two-thirds (or 67%) of the products from the Romeoville facility (approximately 1.3 million tons each year) are shipped via barge. Barges carry aggregate to various locations along the Illinois Waterway system from Chicago to Peoria. If the Romeoville facility were no longer in operation, all of this material would have to be supplied via truck, which is costlier and significantly less fuel-efficient than shipping by barge and increases air pollution and carbon generation. Barges can move one ton of cargo 514 miles on a single gallon of fuel, while trucks can haul the same amount of cargo on one gallon of diesel fuel only 59 miles. In addition to the increase in fuel consumption to ship aggregate by truck, there would be increased equipment use and manpower, raising costs even more. This translates to at least \$5 more per ton to ship from Romeoville to Chicago by truck rather than by barge - more than a 300% increase in costs. The change in the transportation mode from barge to truck would cost an additional \$6.5 million to transport this same material.

20 Using barges to transport aggregate material reduces the number of trucks on the road as well as the associated diesel emissions. In order to ship 1.3 million tons (average annual barge shipments) of aggregate material by truck, an additional 59,000 truck shipments would be on the surface roads and interstates around Chicago annually. Truck shipping emits considerably more air pollutants than barge shipping due to the increased amount of diesel fuel consumed by trucks. The difference in the amount of air contaminants emitted during truck and barge shipping is listed in Table 4 below.

Table 4. Air emissions produced transporting aggregate material.

Air Emissions (Grams/Ton-mile)				
	Hydrocarbons	Particulate Matter	Nitrogen Oxides	Carbon Monoxide
Barge	0.014123	0.007955	0.27435	0.0432
Truck	0.10	0.06	1.45	0.37

30 Based on the above emissions, the increased truck traffic would significantly increase air pollution in the Chicago area. Therefore, transporting aggregate product by barge benefits the local community and the environment by reducing traffic, improving air quality, and reducing the quarry's carbon footprint. In addition, far fewer accidents and fatalities are associated with shipping freight by barge than by train or truck. There is one injury in the marine transport sector for every 95 in rail and 1,609 in the highway sector as well as one fatality in the marine transport sector for every 18 in rail and 132 in the highway sectors. Barge delivery is not available at other HMS facilities in the Chicago area. This transportation option is critical to HMS' operations.

40 Perhaps most importantly, the no-action alternative would also result in no ecological restoration or management of Middle Parcel or other HMS parcels that provide Covered Species' habitat or potential habitat (i.e. Fitzpatrick Seep, River South, ComEd, Long Run, River, North, Far North, and River North Parcels). These are the largest undeveloped, unprotected, and unmanaged private

parcels that provide habitat for the HED in Illinois and habitat for the other Covered Species in the Lower Des Plaines River Valley. They represent a potential linkage across the landscape that would reduce genetic and population isolation between protected lands that contain the Covered Species. As such, these lands represent some of the most promising locations for habitat restoration for the maintenance and expansion of the HED, Blanding's and spotted turtles, and LPC habitats and populations in the Des Plaines River Valley. Without the active management of these sites, the current and potential future habitat they contain will continue to degrade. This includes Middle Parcel, which will not be mined under this alternative, but without management its adult HED habitat (40.81 acres), Blanding's turtle habitat and potential spotted turtle habitat (29.14 acres) will continue to degrade and eventually will be lost.

The negative effects of invasive herbaceous species, such as narrow-leaved cattail, reed canary grass, and common reed and invasive woody species, on the HED habitat has been listed as a threat to the species in the HED Recovery Plan (USFWS 2001) and 5-Year Review (USFWS 2013). Mierzwa (2007) suggests that dense cattail growth and resulting thick thatch layer may inhibit adult HED use of breeding habitat. Other research indicates that common reed and reed canary grass degrade larval habitat areas by reducing crayfish burrow densities (USFWS 2013) that are critical for HED larval survival. In addition, in-field observations suggest that adult HED avoid heavily wooded areas (USFWS 2013).

Other research also has documented the negative impacts of invasive species' encroachment on native plant communities (Apfelbaum and Sams 1987; Apfelbaum 1985). Species such as reed canary grass, cattail, and common reed form dense monocultures that prevent the growth and reproduction of native plant species. Diverse native plant communities provide food, shelter, nesting space, and protection for wildlife. For example, foliage height diversity has been positively correlated with bird species diversity, and later-stage successional communities support a greater diversity of wildlife (Morrison et al. 2006). Declines in oak savanna species diversity have been correlated to declines in breeding bird and butterfly species diversity (Haney and Apfelbaum 1990). Remnant communities are generally higher quality than other communities (e.g. greater diversity) and many species of prairie- and savanna-inhabiting insects in the Chicago region are known to be remnant-dependent (Panzer et. al.1995). Research has also documented that invasive herbaceous (e.g. common reed and reed canary grass) and woody (e.g. buckthorn) species can negatively affect the behavior and habitat of adult and larval HED (USFWS 2014b). Therefore, as plant communities in the Planning Area succumb to invasion and lose diversity, it is reasonable to expect subsequent declines in wildlife species diversity (Apfelbaum and Chapman 1997; Haney and Apfelbaum 1990). The substantial decline of habitats as a result of invasion by exotic and weedy species, as described above, will reduce the ability of HMS' parcels and other habitat areas to support the HED, the covered turtles, and LPC.

Lastly, this ("No Action") alternative also does not include any of the groundwater impact avoidance measures proposed by HMS under the Preferred Alternative with the complete conservation package (i.e. River South Bluff Parcel infiltration gallery and Forest Preserve District of Will County (FPDWC) infiltration pond). While the proposed groundwater enhancement measures are intended to prevent groundwater impacts from future surface mining, these engineered enhancements are flexible in their design and may be utilized to prevent or reduce unforeseen groundwater impacts to wetlands habitats from other anthropogenic sources, such as increased withdrawal of nearby community water supply wells and/or citing of new production wells. The proposed hydrological enhancements under the Preferred Alternative provide the flexibility of supplying additional water in periods of extended droughts. HMS will provide additional water to

address the above situations only if directed to do so by the regulatory agencies. The Preferred Alternative also offers long-term solutions to maintaining local hydrology in wetland habitat areas by plugging the tunnel under Rt. 53 and allowing the Pierce-Eich Quarry's groundwater level to return to historic levels after surface mining is complete. The benefit of improving local hydrology will not be realized under the No Action Alternative. There are no plans under this scenario to plug the tunnel under Rt. 53 to seal off the Pierce Eich Quarry in order to increase groundwater levels.

Thus, the No Action Alternative is rejected because it is impracticable. It would (1) effectively shut down Hanson Material Service's operations in Romeoville in approximately five years, thus failing entirely to achieve HMS' purpose and need; (2) increase local market costs, and increase road traffic and resulting pollution; and (3) without any mitigation measures, it would result in continued degradation of the Covered Species' habitat, reducing the likelihood of survival and recovery of the Covered Species in the wild.

4.2 Subsurface Mining Alternative

The next alternative HMS considered was underground mining. In order to subsurface mine, an extensive engineering plan and stone analysis will need to be prepared. Until this work is completed, the option to underground mine is a consideration and may be practicable, but it is not certain that this alternative is viable. This alternative would allow HMS to continue its mining operations at its Romeoville Facility. Subsurface mining would extract aggregate from the Galena-Platteville Groups, which are located approximately 300 to 700 feet below ground surface at the Romeoville Facility. These units underlie the shaley and argillaceous bedrock formations within the Maquoketa Group. Due to the low permeability of the Maquoketa Group, they act as a regional aquitard limiting the vertical transmission of groundwater from the overlying Silurian Aquifer.

The Silurian Aquifer discharges into the Des Plaines River Valley supplying groundwater to seeps and wetlands that support HED and other Covered Species habitat. Subsurface mining would require penetration of the entire thickness of the Silurian Aquifer, so impacts to local hydrology may occur. The access shaft and ventilation shafts that penetrate the lower Silurian Bedrock and the Maquoketa Aquitard would require avoidance measures to be installed to prevent the potential loss of water from the Silurian Aquifer. The decline tunnel entrance (the decline) will most likely emanate through the base of one of the existing quarries. Hydraulic controls will be put into place to limit groundwater flow into the decline from the exposed portion of the Silurian Aquifer. Only the lowest reaches of the Silurian Aquifer will be exposed in the decline if it is advanced from the floor of the Quarry.

In order to construct the decline, a groundwater control program will be implemented to decrease groundwater flow from the aquifer through the Brainard (uppermost) Formation of the Maquoketa Group. Limiting groundwater seepage through the decline is necessary for not only the prevention of head loss in the Silurian Aquifer but also tunnel stabilization and worker safety. The groundwater control program will most likely entail probing during advancement of the decline to test the hydraulic characteristics of the bedrock. Typical Chicago area groundwater control measures for underground mining will be used to ensure groundwater does not enter the subsurface mine through the decline. Potential effects on the Silurian Aquifer are minimal since seepage to the decline will be minimized and any trivial water loss would occur at the base of the quarry, so it would be hydraulically isolated from the upper potentiometric surface outside of the mined area. Similarly, ventilation shafts would be constructed with avoidance measures to prevent groundwater from entering the subsurface mine and avoid dewatering of the Silurian Aquifer.

To prevent water from flowing from the upper aquifer into the decline tunnel and ventilation shafts, they are planned to be constructed and sealed progressively, in short increments, with a hydrostatic lining through the water bearing strata. The hydrostatic liner consists of a substantial thickness of reinforced (fiber, mesh, or both) structural concrete applied to the perimeter walls of the decline or shaft to resist water pressure. The liner thickness will be approximately 12 to 21 inches. The hydrostatic liner will be keyed into the low permeable rocks of the Maquoketa Group to ensure hydraulic short-circuiting does not occur. When the decline tunnel reaches dry strata, a grout plug will be formed around the tunnel at the junction in the rock to stop water tracking down the back of the lining into the Scales Shale. Further field investigation is being planned to evaluate site specific conditions at the decline and shaft locations, with the investigation results being used to inform the hydrostatic liner designs.

Although head loss within the Silurian Aquifer is not anticipated from any dewatering that might occur below the aquitard (STS/AECOM 2008), HMS would pursue an incidental take permit because of the potential for minor impacts to the Silurian Aquifer. Under this scenario, however, the Pierce Eich Quarry would not be inundated with water because access and ventilation shafts will be advanced from the bottom of this and other existing HMS quarries as well as other areas.

Subsurface aggregate mining presents numerous challenges, including design constraints, structural integrity, additional safety measures, and product quality, which influence whether a company can even contemplate subsurface mining. Before beginning subsurface mining, extensive core sampling of the limestone needs to be completed. To date, only limited sampling of the limestone to determine quality has been performed. Once it is determined that the subsurface limestone can be marketed, the room and pillar design and height of the rooms of the mine will be determined based on the limestone's structural strength.

Subsurface mining is also costlier and requires more time to develop than surface mining, for several reasons. Subsurface mining requires the development of declines into which trucks, conveyors, and operators will descend and through which limestone will be routed back to the surface processing plant and stockpiles. Constructing such decline shaft and initial bottom work typically takes 12-18 months. Therefore, after factoring in time for engineering and planning (approximately 6 months), it typically takes at least two years to get an underground mine to start producing limestone. In contrast, extending an existing surface mine can occur within days. In addition, both capital and operational costs are higher for underground mines; subsurface mining requires additional infrastructure, such as a ventilation system, an underground power distribution system, roof bolting (to prevent collapse) and rib scaling. It also requires additional and specialized equipment (e.g. roof bolt machines) to install these systems and to operate an underground mine (e.g. underground crusher and conveyor equipment). In addition, much of the limestone must be left in place (for floors and roofs and the pillars that support them) which results in utilization of about 50% of the limestone in contrast to surface mining which utilizes about 95% of the limestone. This also results in space limitation underground which requires operational modifications that reduce extraction efficiency. Underground mining requires additional safety training of employees, air monitoring, and additional inspection and securing of the ceiling. All of these factors result in higher labor and energy costs and increased risk. In the end, these added measures result in production costs for subsurface mining that are approximately 25% higher than surface mining. In addition to higher operational costs, it is estimated that the capital costs for underground mining at the Romeoville facility for the first five years will be approximately \$53M. In contrast, no additional capital costs would be required to surface mine the same amount of limestone. This

increase in costs will result in increased prices for customers which under today's market conditions would lead to a loss of market share for HMS.

5 This alternative would leave all the known surface limestone reserves, with the possible exception
of 36 acres in East Parcel, untapped. This would jeopardize the economic viability of the proposed
mining project because the added expenses to mine underground would prevent the facility from
competing against other surface mines with lower expenses. It is important to note that underground
10 mining products likely will be much more price competitive in the future when subsurface mining
is proposed under the Preferred Alternative because far fewer local/regional surface mines will be
in operation at that time. While the underground mining alternative would eliminate almost all of
the potential impacts to listed species and their habitat, it would also, more importantly, eliminate
the conservation package of the preferred alternative designed to benefit the Covered Species and
their habitat. Therefore, under this alternative, the remaining habitat on Middle Parcel and other
15 HMS parcels will continue to degrade and eventually will be lost. As a result, this alternative is
rejected because it does not achieve the purpose and need of the applicant's proposed activity and,
with a greatly reduced conservation package, it may reduce the likelihood of survival and recovery
of the Covered Species in the wild.

4.3 Reduced Surface Mining Alternatives

20 Impacts to the Covered Species and their habitat also could potentially be reduced by
changing/reducing surface mining in the proposed mining plan. Currently, the Pierce Eich Quarry
(269 ac), Middle Parcel (125 ac), Middle Quarry (80 ac), North Parcel (31 ac), East Quarry (219
ac), and East Parcel (47 ac) are zoned to allow surface mining. There are several different ways
25 mining can be reduced to lessen potential impacts on the Covered Species, and some are discussed
below. Each of these scenarios also includes surface mining in East Parcel and sub-surface mining
when surface reserves are nearly exhausted.

Reduced Surface Mining Alternative 1 (Exclude Pierce Eich)

30 The first surface mining reduction alternative would eliminate the planned and IDNR-permitted
expansion of Pierce Eich Quarry, but maintain surface mining of Middle Parcel, Middle Quarry,
and East Parcel. Discontinuing mining in the Pierce Eich Quarry (as of the end of 2019) would
result in a reduction in the planned surface-mined area by 35 acres, or 19% (35 of 187 acre).
35 Ceasing operations in the Pierce Eich Quarry would prevent any potential future groundwater
impacts to River South Parcel and Lockport Prairie Nature Preserve (LPNP) both of which are
federally designated critical habitat for the HED and contain potential or known habitat for both
covered turtles. However, under this alternative, River South Parcel and LPNP, which contain the
most productive HED breeding habitat in the state, will be more susceptible to unforeseen
40 anthropogenic impacts and possible extended drought conditions than under the preferred
alternative since groundwater enhancements in the preferred alternative (i.e. AMMs) proposed for
these parcels (i.e. River South Bluff Parcel groundwater infiltration gallery and FPDWC infiltration
pond), which could be used to lessen the effect of these impacts, will not be implemented. In
addition, Pierce Eich Quarry will not be filled because the tunnel plug under Route 53 would not be
45 installed. Surface and subsurface mining operations would continue as planned in the Preferred
Alternative in Middle Quarry and Middle Parcel. Although Reduced Surface Mining Alternative 1
would eliminate any potential future indirect mining impacts on groundwater in the habitat areas of
River South and LPNP, these sensitive areas would not benefit from the planned AMMs that could
buffer potential anthropogenic impacts to groundwater and extended drought, or the permanent

solution to potential groundwater impacts by allowing Pierce Eich Quarry to naturally inundate and maintain near-constant head conditions west of Route 53.

5 Groundwater modeling simulations indicate that surface mining Middle Parcel - without the benefit
of an inundated Pierce-Eich Quarry may have some effects on hydrology of the Covered Species
habitat in nearby parcels. Surface mining of Middle Quarry and East Parcel will not affect
hydrology at other parcels because of the limited mining in Middle Quarry (1.3 acres) and the
10 location of East Quarry between two hydraulic boundaries – the river and the canals. However,
surface mining in Middle Parcel will likely affect groundwater levels in the adjacent North Parcel,
the Midwest Generation easement parcel (located north and east of North Parcel), and the Far North
Parcel. Based on long-term simulations in the groundwater model, the cone of depression from
Middle Parcel extends about twice as far to the north under this alternative as it does under the
Preferred Alternative (fully encompassing Far North Parcel) and may be observed in the southwest
15 portion of River North Parcel. This alternative would not benefit from the near-constant head levels
in the filled Pierce Eich Quarry, so the resulting cone of depression suggests there is a greater
susceptibility to groundwater level impacts north of Middle Parcel. However, groundwater
modeling results do not indicate impacts to groundwater levels in RPNP. In addition, the impacts to
River Parcel from this alternative and the Preferred Alternative are similar.

20 The habitat of the Covered Species will remain close to current conditions on these parcels adjacent
or near Middle Parcel because they are also strongly influenced by surface water. The wetlands on
the North parcels are strongly influenced by surface water because of the size of the watershed that
drains to them (AECOM 2014b). This is also true for River Parcel since almost all of the wetlands
25 on the parcel are adjacent to the river and its backwaters. Restoration activities would continue to be
planned for North Parcel, Far North Parcel, River North, and River Parcel to improve wetland and
Covered Species' habitat conditions and offset potential groundwater impacts if this alternative was
pursued. Groundwater modeling does indicate that surface-mining Middle Parcel will not impact
groundwater levels in River South Parcel. Water level changes are also not projected to be impacted
30 at RPNP, although monitoring would have to be conducted to verify these results since the extent of
drawdown south of RPNP would be greater under this scenario.

All of the parcels adjacent to or north of Middle Parcel contain adult HED habitat but none contain
larval habitat (Figure 9.2 and 9.3). These same parcels, including RPNP, contain known Blanding's
35 turtle habitat, but only RPNP contains known spotted turtle habitat (Figures 10 & 11). Since there is
a possible risk to hydrology at North, Far North, and River North, and the associated habitat to the
Covered Species, groundwater AMMs may be required to protect these nearby parcels in this
mining alternative. Specific AMMs for this alternative were not fully evaluated, since it is not the
preferred alternative. However, the goal of AMMs for this alternative would be to provide hydraulic
40 separation to limit the propagation of drawdown from Middle Parcel to parcels to the north. Two
AMM possibilities would be supplementing groundwater quantities or reducing hydraulic
conductivity within the bedrock to reduce the effects of quarry dewatering. Installation of a
detention/infiltration pond to capture runoff on the north side of the Far North Parcel (as described
in Chapter 5) would provide supplemental water to the bedrock aquifer and provide a buffer
45 between HMS parcels and RPNP. Pumping water to a drainage way that flows to the wetlands on
North and Far North Parcels could also help maintain the hydrology of these sites. Again, these
AMM scenarios have not been fully evaluated and are not preferred because of performance and
cost concerns.

Pierce Eich is not designated critical habitat. Therefore, the direct impact to critical habitat under this alternative would be the same as it is under the Preferred Alternative. Although mining Middle Parcel would impact 115 acres of mapped HED Critical Habitat, there is no suitable larval habitat on the parcel, and the usable adult HED habitat is only 40.81 acres (see Figures 9.2 and 17) which is not a limiting factor for HED survival. Both adult HED habitat Primary Constituent Elements (PCEs) are present on the parcel but only three of five larval habitat PCEs (1, 3, and 5) are present (see Section 5.1.6) (Note for PCE 1 that soils are hydric but not histosols). In addition, although there is recent evidence of attempts to breed on the site (i.e. territorial males), it is very unlikely, due to site conditions, that those attempts have been successful (Mierzwa 2013).

This Reduced Surface Mining Alternative 1 would have the same direct impacts to critical habitat as the Preferred Alternative, but would have less indirect impacts, such as the potential for impacts to groundwater levels in some habitat areas. However, under this alternative, the Covered Species and their habitat will not benefit from the groundwater enhancements planned for River South that are included in the Preferred Alternative.

Finally, removing Pierce Eich from the surface mining plan would leave approximately 19% of the available surface limestone reserves untapped, a fact which significantly reduces the economic viability of the proposed mining project. As explained above, this reduction in the surface mining area might reduce some environmental (groundwater) impacts at River South but other impacts would remain (i.e. impacts to critical habitat). Most significantly, a reduction in the mining plan would reduce proportionately the planned mitigation in the Preferred Alternative which is designed to benefit the Covered Species and their habitat. It would also reduce planned groundwater avoidance and enhancement measures that will buffer anthropogenic changes to groundwater supplies, and as a result help stabilize the near-term and long-term hydrology of local habitats. Because of these issues, this alternative was rejected by HMS; it achieves only a portion of the purpose and need of HMS' proposed activity and, without the complete conservation package (i.e. mitigation and AMMs), would reduce the likelihood of survival and recovery of the Covered Species in the wild.

Reduced Surface Mining Alternative 2 (Exclude Middle Parcel)

The second surface mine reduction alternative would maintain the full mine build-out in Pierce Eich Quarry, Middle Quarry, and East Parcels, but would exclude Middle Parcel from the mining plan. Eliminating Middle Parcel from the mining plan would result in the reduction of available surface mining area by 61%, or a loss of 115 acres out of an available 187 acres. Middle Parcel is the only federally designated Critical Habitat for the HED and known habitat for the Blanding's turtle in the Preferred Alternative that would be mined, so this alternative would eliminate direct impact to these protected resources. As explained under the previous alternative, although mining Middle Parcel would impact 115 acres of mapped Critical Habitat, there is no suitable larval HED habitat on the parcel and the usable adult HED habitat is only 40.81 acres (see Figures 9.2 and 17). Both adult PCEs are present on the parcel but only three of five larval PCEs (1, 3, and 5) are present (see Section 5.1.6). In addition, although breeding likely occurred (infrequently and in small numbers) on the parcel in the past (Cashatt *et. al.* 1993) (Vogt and Cashatt 1999) and there is evidence of recent attempts to breed on the site (i.e. territorial males), it is very unlikely, due to site conditions, that it has been successful (Mierzwa 2013). In addition to the known HED adult habitat, there are 24.85 acres of land that could be restored to adult HED habitat if Middle Parcel were not mined (see Restorable Habitat memo; Appendix B).

Site hydrology may only slightly improve in Middle Parcel under this alternative. Assuming Pierce Eich is allowed to inundate in this alternative, Middle Parcel would likely be less susceptible to groundwater level declines during periods of little rainfall. In addition, seasonal fluctuations of groundwater levels adjacent to the Middle Quarry may become less pronounced due to the near-constant head conditions in the Pierce-Eich Quarry. However, since groundwater levels have consistently remained in the shallow subsurface in the Middle Parcel over the past decade, significant improvements to the Parcel's vegetation and habitat would not be expected since hydrologic conditions will remain similar. Improvement of HED breeding habitat is difficult to imply since groundwater discharge at the ground surface would still not be likely – or at least occur at such infrequencies that it would not suggest significant HED breeding habitat could be established or maintained. Significant improvement to Blanding's turtle habitat would not be expected either.

Potential groundwater impacts to adjacent (North and River Parcels) and nearby parcels (Far North, River North, and River South) will be avoided in this alternative. AMMs would be constructed for River South Parcel and LPNP and Pierce Eich quarry would be allowed to inundate after mining is complete.

However, because Reduced Surface Mining Alternative 2 includes future mining of Pierce Eich, it would still have potential indirect groundwater impacts to River South and LPNP, which contain most of the HED breeding habitat in the state. Those potential groundwater impacts could be avoided under this alternative, as they would be under the Preferred Alternative, through the use of groundwater AMMs described in Section 5.1.3 (i.e. River South Bluff Parcel infiltration galleries and FPDWC infiltration pond). Therefore, this alternative would have some of the same environmental impacts as the Preferred Alternative (i.e. indirect groundwater impacts to habitat areas), but would eliminate others, such as direct impacts to HED Critical Habitat and Blanding's turtle habitat and the reduction in habitat connectivity. It is important to note that much of the habitat connectivity would be regained under the Preferred Alternative through the restoration of habitat on parcels adjacent to and near Middle Parcel (i.e. River, North, Far North, and River North Parcels), and this restoration will not occur under this alternative.

Additionally, removing Middle Parcel from the surface mining plan would leave approximately 61% of the available surface limestone reserves untapped, thereby significantly reducing the economic viability of the proposed mining project. As explained above, that reduction in the surface mining plan area will reduce some environmental impacts but not others. Most significantly, however, a reduction in the mining plan would reduce proportionally the planned mitigation (designed to benefit the Covered Species and their habitat) in the Preferred Alternative. If Middle Parcel is not included in the mining plan, far less acreage of habitat and potential habitat will be preserved and/or restored but instead will continue to degrade. As a result, this alternative was rejected because it would achieve only a portion of the purpose and need of the HMS' proposed activity and, without the comprehensive conservation package (i.e. mitigation and AMMs), would reduce the likelihood of survival and recovery of the Covered Species in the wild.

4.4 Surface Mining Other HMS Romeoville Parcels Alternative

Surface mining of Middle Parcel (115 acres) and/or Pierce Eich Quarry (35 acres) could potentially be reduced or eliminated by mining other areas in HMS' Romeoville facility, such as River, North, Far North, and River North Parcels. These alternative parcels would be mined in addition to other planned parcels: Middle Quarry and East Quarry. Alternative parcels could provide approximately

61, 29, 46, and 25 acres, respectively, of mining reserves of what is believed to be similar quality stone as that found in Middle Parcel and Pierce Eich Quarry. However, the actual quality of the stone in these parcels has never been determined because these alternative parcels have a number of limitations.

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First, mining any of these parcels would result in proportionally greater wetland impacts than mining Middle Parcel (29.7 wetland acres of 125 total acres (of which 115 acres will be mined)) (see Figure 15.1) since they all have a higher proportion of wetlands (River: 40.8 of 61 acres, North: 19.6 of 31 acres, Far North: 14.5 of 50 acres, and River North: 13.6 of 25 acres). In addition, while North Parcel contains 1.85 acres of high-quality wetlands (i.e. wet-mesic dolomite prairie and sedge meadow), none of the other parcels do. This compares with 6.01 acres of wet-mesic dolomite prairie on Middle Parcel.

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Second, nearly all of River and over half of River North Parcel are in the floodplain of the Des Plaines River.

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Third, each of the above parcels contains federally designated critical habitat for the HED, and mining any of them would fragment habitat and reduce connectivity (including isolating the portion of Middle Parcel preserved under this alternative). However, like Middle Parcel, none of these parcels have all the larval PCEs (see Section 5.1.6). These four parcels only have two of five larval habitat PCEs (3 and 5) with the exception of North Parcel, which also contains occupied crayfish burrow (PCE 4). Although they all contain wetlands with hydric soils, none have organic soils (i.e. histosols) (PCE 1) according to the Will County Soil Survey (Struben 2012). Middle Parcel also contains PCE 3 and 5 and hydric soils but not histosols for PCE 1. All four of these parcels, like Middle Parcel, contain both adult HED habitat PCEs (5 and 6). Although none of the natural wetland communities on any of these five parcels are located near breeding/larval habitat, some on each parcel do provide open corridors for adult HED movement and dispersal.

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Middle Parcel contains 40.81 acres of mapped adult HED habitat, while River, North, Far North, and River North Parcels contain 30.35, 18.32, 26.71, and 1.80 acres of adult HED habitat, respectively (see Appendix B, Table B-1) for a total of 77.18 acres. Middle Parcel also has 115 minable acres, which is far more than any other parcel. Adult HED have been observed on Middle, North, River North, and River Parcels, but Middle Parcel has been surveyed far more often (i.e. 17 years) than the other parcels. There is no current larval habitat on any of these parcels.

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Fourth, three of these parcels (i.e. North, Far North, and River North) contain known Blanding's turtle habitat and potential spotted turtle habitat, while River Parcel contains only potential habitat for both turtles. Middle Parcel also contains known Blanding's turtle habitat and potential spotted turtle habitat; it contains 29.14 acres of potential turtle habitat. Additionally, six juvenile Blanding's turtles were found on the site in 2015 (Feng and Dreslik 2015). Prior to this, Blanding's turtle had only been observed near but not on the parcel. No Spotted turtles have been found on or near Middle Parcel. North Parcel contains 20.22 acres of potential habitat, and Blanding's turtle was observed entering that parcel from Middle Parcel in 2013. Far North Parcel contains 18.56 acres of potential turtle habitat, and a Blanding's turtle was tracked to the site in 2009. Two Blanding turtles were tracked to River North Parcel that same year (Banning and Dreslik 2010), and one was found on the parcel in 2015 (Feng and Dreslik 2015). This parcel contains 14.63 acres of potential turtle habitat. No spotted turtles have been found on North, Far North or River North Parcels.

Fifth, mining any of the three “North” parcels would negatively impact the groundwater hydrology of RPNP (also designated critical habitat) due to their closer proximity to the preserve than Middle Parcel. Mining Middle Parcel, conversely, would not impact the groundwater levels in RPNP. Mining any of the “North” parcels also would affect the groundwater levels on the other adjacent and nearby parcels, including Middle Parcel. Hydrologic impacts of the North parcels are interpolated based on inferences of the hydrogeologic setting and previous modeling that included North Parcel (AECOM 2012). RPNP contains habitat for all five covered species; therefore, groundwater impacts to the preserve could negatively affect the habitat of any of these species. Aside from LPNP, RPNP is the only parcel in the Permit or Planning Area that contains habitat for all five covered species.

Sixth, there are many operational limitations associated with the area north of Middle Parcel including: 1) ComEd, not HMS, owns a substantial portion of this area; 2) it is closer to residential areas and Far North and River North Parcels are not zoned for mining (and the Village of Romeoville is unlikely to approve mining); and 3) Far North contains a closed landfill. Finally, surface mining from a new (unmined) location would be much costlier and less efficient than mining from an existing mine face. Mining in Middle Quarry and Middle Parcel will be done on existing mine faces.

As a result, this alternative was rejected by HMS because the feasibility of mining in those areas is very unlikely given all of the operational limitations. In addition, even if it were allowed, it would not reduce the impacts to wetlands or Covered Species habitat (and may even increase them, compared with the Preferred Alternative) and may have detrimental effects to groundwater hydrology in the vicinity of the RPNP. Like other alternatives that involve reducing the planned surface mining, mitigation efforts would be less than those in the Preferred Alternative, which would reduce the benefit to the Covered Species. Therefore, this alternative could reduce the likelihood of survival and recovery of the Covered Species in the wild. In addition, mining in this area would be more difficult and costlier than mining in Middle Parcel (under the Preferred Alternative) and, therefore, will not achieve the purpose and need of HMS’ proposed activity.

4.5 HMS’ Preferred Alternative

HMS’ aggregate and support operation at its Romeoville, Illinois, facility is unique because it is the only regional limestone production operation that can ship materials via truck, rail, and barge. Transporting limestone product by barge provides numerous benefits to the local community and the environment. It is safer than other forms of transport; it reduces traffic, improves air quality, reduces carbon emissions, and reduces costs (for the customers). Therefore, this facility is an important and economical limestone source for both local and regional markets. In addition, HMS has a significant positive impact on the local economy by way of payroll, tax base, and secondary employment.

Under the Preferred Alternative, HMS plans to continue surface mining its two currently active mines, Pierce Eich and Middle Quarry, and to expand surface mining into Middle Parcel and East Parcel. HMS proposes to mine 35 additional acres in Pierce Eich and only one additional acre in Middle Quarry. Pierce Eich will be mined first and when mining is nearly completed there, HMS will resume mining Middle Quarry and begin surface mining in Middle Parcel. (Therefore, there may be concurrent mining of Pierce Eich with Middle Quarry and/or Middle Parcel during the last few years of mining Pierce Eich.) Approximately 115 acres will be mined in Middle Parcel. HMS also plans to surface mine 36 acres in East Parcel. All of this surface mining is estimated to take

about 35 years. However, since mining East Parcel will not require an ITP or ITA, HMS is seeking a 30-year permit. This alternative also includes subsurface mining, which is planned to start prior to the completion of surface mining, once the company has been able to demonstrate success with underground mining and once local market conditions indicate that establishing an underground mine is financially viable. Underground mining will occur approximately 350 feet below the surface of the Romeoville Facility. HMS anticipates having local technical experience and equipment to mine underground in place prior to completion of mining surface reserves (see Section 4.2 Subsurface Mining Alternative for more details on underground mining). Under this alternative, all access and ventilation shafts installed during the permit period will be located in mined areas or other areas of HMS' property not preserved under the HCP. The mining plan is described in greater detail in Chapter 3 and in the HMS Mining Plan (Appendix E).

HMS' Preferred Alternative will protect, restore, and enhance wetland and habitat quality on several designated HMS-owned parcels; it will also protect the groundwater supply to some of these and other important habitat areas.

As part of the Preferred Alternative, HMS will restore, enhance, or maintain 354.0 acres of Covered Species habitat on eight HMS parcels (River South, Fitzpatrick Seep, River, North, Far North, River North, ComEd, and Long Run Parcels). This will include salvaging and transplanting the wet-mesic dolomite prairie in Middle Parcel (6.01 acres) to the ComEd Parcel. Restoration plans are summarized in Chapter 3 and described in greater detail in Chapter 5 and in the Restoration Plan Set (Appendix F). This plan also includes permanent protection of 518.9 acres of the 530.9 acres preserved through a Declaration of Covenants, Conditions, and Restrictions (declaration of restrictions), including the eight mitigation parcels listed above, plus the River South Bluff Parcel. The restoration, enhancement, maintenance, and preservation of habitat that is included in the conservation plan of this alternative is designed to protect and enhance important existing habitat areas for the Covered Species, restore and expand habitat in other areas, and protect and enhance corridors for movement of these species.

Under the Preferred Alternative, HMS also plans to implement a number of avoidance and minimization measures (AMMs) to prevent potential groundwater impacts to the HED and other Covered Species habitat from future mining of Pierce Eich Quarry. The AMMs include installation of infiltration galleries in River South Bluff Parcel to supplement shallow groundwater supplies to River South Parcel and construction of an infiltration pond on FPDWC property at the southwest corner of Rt. 53 and Renwick Rd. to prevent potential negative impacts on groundwater levels at LPNP. In addition, this alternative provides a permanent solution to potential groundwater impacts from mine dewatering, since dewatering of the Pierce Eich Quarry will cease after mining is complete, in conformance with its permit and reclamation plan. A plug in the tunnel under Route 53 will allow the parcel to be naturally inundated and maintain near-constant head conditions west of Route 53. These measures are discussed in Chapter 5 and are addressed in several groundwater modeling documents, including AECOM 2013b, AECOM 2014b, AECOM 2015a, and AECOM 2016.

The conservation package under the Preferred Alternative is sufficient because all proposed AMMs and mitigation were selected and designed to directly avoid or offset all potential impacts to the Covered Species from the proposed activities. Therefore, no additional conservation measures are needed.

While it is true that all other surface mining alternatives evaluated above would avoid impacts to Covered Species habitat on Middle Parcel and/or groundwater impacts to other habitat areas, the degradation of wetland and habitat quality and function will continue under all but the Preferred Alternative. The Preferred Alternative is the only alternative that includes a comprehensive conservation package (AMMs and mitigation) that will help ensure the continued survival and recovery of the Covered Species in the wild. Untouched, the condition of the wetland habitat in Middle Parcel will continue to decline because of invasion by weedy, woody (e.g. buckthorn) and herbaceous (e.g. *Phragmites*) species. Such degradation will occur not only in Middle Parcel but also in other parcels owned by HMS that contain Covered Species habitat, such as River South. Furthermore, the Preferred Alternative offers short- and long-term solutions to potential hydrologic impacts from surface mine dewatering, which is not included in most other alternatives.

The strength of the Preferred Alternative is that it not only meets HMS' business needs, it also provides a comprehensive mitigation plan and conservation package that will protect existing habitat for the Covered Species and goes beyond compensating for any "take" of these species by enhancing, restoring, and maintaining hundreds of acres of their habitat, thus providing potential for recovery of these species. Permitting the proposed use of surface reserves in Pierce Eich, Middle Quarry, and Middle Parcel will help initiate and fund, through an accepted Habitat Conservation Plan, the protection, preservation, restoration, and management of high-quality wetlands and Covered Species habitat in this area of the lower Des Plaines River Valley.

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5.0 POTENTIAL BIOLOGICAL IMPACTS, IMPACT ANALYSIS, and MITIGATION

5.1 Hine’s Emerald Dragonfly

5 The principal threat to the HED in Illinois is habitat degradation and alteration. This includes direct
loss of habitat, such as the filling or removal of wetlands, as well as indirect alterations of habitat,
such as changes in surface and sub-surface hydrology. Alteration of hydrologic regimes could
adversely affect the larval and breeding habitat of the species by changing water temperature, flow,
10 impervious surfaces, and alteration of surface drainage patterns could all cause reductions in the
suitability of habitat or the outright loss of suitable larval and breeding habitat. Transportation and
roadways are also a threat to this species, both from direct mortality and habitat destruction or
fragmentation. Land use practices, fire suppression, agricultural development, and expansion of
invasive species have also reduced available habitat for the HED, as well as the abundance of
15 insects for prey across its range. The following chapter details the anticipated impacts from HMS’
Covered Activities on the HED within the Permit Area as well as the mitigation plan and
conservation package to off-set these impacts.

5.1.1 Activities and Impact Analysis

20 HMS proposes to continue surface mining its two currently active quarries (Pierce Eich and Middle
Quarries) at its Romeoville facility, expand the Middle Quarry surface mining into Middle Parcel,
expand surface mining of the East Quarry to the north into East Parcel, and perform sub-surface
mining of Galena-Platteville limestone underlying its facility. HMS plans to resume surface mining
25 Middle Quarry and expand into Middle Parcel when surface mining in Pierce Eich Quarry is nearly
complete (Figure 2 and 15.1, Appendix A). Surface mining in East Parcel, which will not impact
the HED or its habitat, is anticipated to start while surface mining is underway in Middle Parcel,
probably around the time of its completion. All surface mining is anticipated to be completed over a
period of approximately 35 years. However, all surface mining that will require an ITP or ITA
30 (Pierce Eich Quarry, Middle Quarry, and Middle Parcel) is anticipated to be completed in the 30-
year permit period. Subsurface mining will start in approximately 15 years and prior to the
completion of surface mining. Associated mining activities (e.g. crushing, conveying, screening,
and stockpiling) will also occur during the permit term. These plans are explained in detail in HMS’
Mining Plan found in Appendix E and summarized in Section 3.2. In addition, HMS will retain a
35 small setback strip (350’ back from Route 53) along the west side of North and Far North Parcels
for possible future development while the rest of the parcels will be preserved in perpetuity (Figure
16).

40 HMS proposes to conduct activities and implement measures that will avoid, minimize, or mitigate
impacts to the HED and its habitat. These are described in greater detail later in this chapter
(Section 5.1.3 & 5.1.6) and in the Restoration Plan Set (Appendix F). This will include constructing
a permanent access route through wetlands in Long Run and ComEd parcels.

45 Approximately 41 acres of Middle Parcel are used as adult HED habitat (open and well-vegetated
wetland and upland areas) (see Figure 17 and the Restoration Plan Set in Appendix A). The
remainder of the site (84 acres) is fill material, scraped areas, buckthorn thickets, and young
woodlands. It is very unlikely that occupied larval habitat exists on Middle Parcel (Mierzwa 2013).
Observations of territorial males have been made at low frequencies and is the only evidence of
possible breeding that has been documented on this parcel over the past 20 years, but by itself does
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not indicate successful breeding. There has been no evidence of successful population recruitment (larvae, exuviae, teneral) in over 20 years (Mierzwa and Webb 2009). The lack of perennial surface water and the absence or extreme rarity of crayfish and their burrows, or any other suitable sub-surface refugia, is believed to preclude the possibility of larval survival under current conditions.

No direct take of adult HED is anticipated to occur during mining operations in Middle Parcel because all stripping (removal of overburden) will be conducted outside the adult HED flying season (May 15 to October 15). In addition, overburden removal to expose the bedrock to be mined will proceed at least 150 feet in advance of the actual mining and all vehicles operating within the flying season will travel at low speeds (i.e. < 15 mph). No take of larvae is anticipated because no HED larvae are found on the parcel based on several years of studies that have not found larvae or appropriate habitat conditions (Mierzwa and Webb 2012c and Mierzwa 2013a).

Mining Middle Parcel is not anticipated to have any potential impacts to groundwater levels at nearby larval habitat areas or at local Illinois Nature Preserves since the Pierce-Eich Quarry will be inundated when mining in Middle Parcel is complete (AECOM 2014b). An inundated Pierce Eich Quarry provides hydraulic controls on groundwater levels since it will provide near constant head conditions. Thus, the expansion of the cone of depression that would have otherwise propagated outward from Middle Parcel will be limited by the influence of the inundated Pierce Eich Quarry. Steady-state drawdown from Middle Parcel after full buildout is expected to be limited to the area immediately adjacent to the future quarry primarily on the north and east sides (AECOM 2014b). Drawdown will likely extend throughout North Parcel and possibly be noticeable in the southern portion of Far North Parcel. Drawdown in River Parcel, located east of Middle Parcel, will decrease quickly as it moves away from Middle Parcel and approaches the river. Drawdown west of Middle Parcel will be limited by the inundated Pierce Eich Quarry.

The predicted drawdown of the water table will be one to three feet in North Parcel from mining Middle Parcel. One exception is the very south-central portion of the site where drawdown adjacent to the quarry would likely increase (AECOM, Dec 19, 2014). Movement of an enhanced cone of depression into the area underlying North Parcel will induce more flow from surface water to groundwater beneath these parcels. Reduction in any base flow from groundwater to the wetlands would be expected and impact the hydrology of the parcel. The hydroperiod of the North and Far North wetlands, however, are fed predominately by surface water.

Significant quantities of surface water runoff support the hydrology of North and Far North Parcel wetlands. The watershed for these parcels extends nearly a mile west of Route 53 onto portions of Romeoville High School, ComEd Easement, as well as the Nottingham Ridge and Hampton Park subdivisions. The watershed encompasses approximately 320 acres. The estimated surface water discharge to these parcels is approximately 14 million cubic feet per year, assuming an average precipitation of 39.6 in./yr (NCDC at Lewis Airport from 1997-2012) and a runoff rate of 30% for the moderately impervious watershed. Much of the surface water runoff collected from this watershed is stored within the wetlands before it evaporates, infiltrates, drains to the Des Plaines River or is utilized by the wetland vegetation. In addition, most of Far North Parcel does not appear to be significantly affected by Middle Parcel mining since much of the parcel is upland fill.

Surface elevations within the wetlands located directly west of the Midwest Generation easement vary between 583 and 584 ft msl, but the water table averages 582 ft msl based on the water levels collected at well NP-2S. Therefore, groundwater is typically a few feet below the base of the

wetland areas throughout the year. In addition, observations of these wetland areas indicate that they become seasonally inundated in response to rainfall events. Most of the wetlands on North and Far North Parcels are cattail and *Phragmites* dominated marshes neither of which is dependent on groundwater hydrology. This also indicates that most wetlands on site are surface water fed and, therefore, reductions in groundwater levels are not anticipated to change vegetation significantly and diminish habitat quality in North Parcel. Furthermore, any potential negative change in habitat in North or Far North Parcel will be offset by the overall improvement to the parcels' habitat through the removal of invasive species, including *Phragmites* and buckthorn, as part of mitigation under this HCP.

Any potential change in habitat due to groundwater draw down in River Parcel will also be offset through the removal of woody and herbaceous invasive species, such as *Phragmites*, green ash, and buckthorn. Groundwater impacts to habitat in this parcel will be very limited because almost all wetlands on the site are found along the river and its backwaters which heavily influence their hydrology.

Although both HED and Blanding's turtle habitat areas are found on North and Far North Parcels, that habitat is limited due to the history of disturbance (e.g. fill) on the parcels. No HED larval habitat is present in North Parcel. Larval surveys and field inspections on North Parcel have found no larvae or groundwater sourced rivulets (Mierzwa 2013b and Mierzwa and Webb 2014). Likewise, no suitable larval habitat has been found on Far North Parcel (AES 2013 and Mierzwa and Webb 2016).

Temporary or permanent avoidance and minimization measures for hydrologic impacts do not appear warranted for mining Middle Parcel. Potential hydrological impacts are already being minimized due to Middle Parcel's location next to the Des Plaines River and the positive hydraulic influence after the inundation of Pierce Eich Quarry. Monitoring of habitat on North, Far North, River North, and River will continue throughout the HCP period to ensure hydrology changes are not negatively impacting HED or covered turtle habitat.

Surface mining of the Pierce Eich (West) Quarry, located west of Route 53 and included in the Permit Area (Figure 2, Appendix A), will continue out to its permitted (IDNR permit #143-98) limits (35 ac remaining of 206 ac total). This parcel does not contain HED habitat (Figure 9, Appendix A) but is located within the estimated groundwater recharge zone of River South Parcel and within the two-mile recharge buffer for both River South Parcel and Lockport Prairie Nature Preserve (LPNP) (Figure 4, Appendix A) (GAS 2004b and 2005b). River South and LPNP contain both larval and adult HED habitat and are the two most productive breeding areas in the state (as well as the Southern Recovery Unit) and account for 84-91% of the Illinois population (Soluk and Mierzwa 2012). Mining the remaining surface reserves in the Pierce Eich Quarry will likely result in potential groundwater impacts to River South and River South Bluff Parcels. The potential for decline in groundwater levels and corresponding seep discharge rates is less for LPNP. No direct take of adult or larval HED is anticipated during mining operations at Pierce Eich because it does not contain HED habitat.

Neither Middle Quarry nor East Parcel contain habitat for the HED or other listed species. Thus, no direct take is anticipated during the mining of these parcels. East Parcel is hydraulically separated from all larval habitat areas (and Critical Habitat Units) by the Des Plaines River to the west and the Chicago Ship & Sanitary and I&M canals to the east. Expansion of the East Quarry to the north will result in a decline in water levels to the north, but propagation of the cone of depression will not

5 extend to the east and west because of these hydraulic barriers. Thus, no potential impacts to the groundwater hydrology in habitat areas are expected from mining (36 acres) in this parcel. Only one acre will be mined in Middle Quarry. No potential groundwater impacts to nearby larval habitat (e.g. River South) are expected from this activity either, since the area to be mined is adjacent to the existing surface mine.

10 The small setback strip (350' back from Route 53) along the west side of North (6.49 acres) and Far North Parcels (10.65 acres) that may be developed during the permit period contains old field and buckthorn thickets on fill and provide 1.10 and 7.30 acres of adult HED habitat, respectively. No larval habitat is present in these areas. An Ecological Maintenance Easement will be placed on the west 350 feet of the North and Far North Parcels when they are sold or developed that allows for impacts (i.e. dust and smoke) to the parcels from any ecological management activities on the adjoining North and Far North Parcels (see Ecological Maintenance Easement in Appendix I).

15 **5.1.2 Biological Goals and Objectives**

20 As stated in Section 1, the overall goal of this HCP is to positively contribute to the objective of the USFWS HED Recovery Plan. The objective of the Recovery Plan is to assure the long-term viability of the HED populations (USFWS 2001). The Recovery Plan provides criteria for reclassifying the HED from endangered to threatened and criteria for removing the HED from the federal list (i.e. delisting). The criteria for delisting are provided below and in Section 2.2.1.

25 The Recovery Plan also provides a recovery outline that recommends specific actions to be taken to achieve the recovery criteria and meet the plan's objectives. These actions are:

- protect and manage extant populations,
- conduct studies,
- conduct searches for additional HED populations,
- conduct an information and education program,
- 30 • conduct a reintroduction and augmentation program, and
- review and track recovery progress.

35 HMS has made commitments that will contribute to meeting the recovery criteria by following the recommended actions listed above, as applicable. HMS' specific avoidance, minimization, and mitigation measures are discussed in the sections below (5.1.3 & 5.1.7) as well as in the Restoration Plan Set (Appendix F).

Addressing Recovery Plan Goals

40 This habitat conservation plan will contribute to realization of each of the three Criteria for delisting set forth in the Recovery Plan in the following ways:

1. *CRITERION 1: Each of the two Recovery Units contains a minimum of three populations composed of at least three subpopulations. Each subpopulation contains a minimum of 500 reproductive adults for 10 consecutive years.*

45 This plan will protect, expand, restore, and enhance habitat in the Southern Recovery Unit for the HED, specifically for Illinois Subpopulation 1 which is by far the largest subpopulation of the second largest population (Illinois) in the Southern Recovery Unit (the Northern Unit comprises

portions of Northern Wisconsin and Michigan only). Subpopulation 1 is the core of the Illinois population, comprising 84-91% of the entire state population. This plan will protect (by avoiding impacts) the groundwater hydrology of three Critical Habitat Units (CHU 1 - Lockport Prairie Nature Preserve; CHU 2 - River South-Fitzpatrick seep; and CHU 3 – Romeoville Prairie Nature Preserve) and restore, enhance, and/or preserve habitat in two CHUs (CHU 2 - River South-Fitzpatrick seep, River Parcel, North Parcel, Far North Parcel, and River North Parcel; and CHU 7-ComEd and Long Run Parcels). Specific habitat preservation, restoration and enhancement objectives are included in the Section 5.1.7.

10 2. *CRITERION 2: Within each subpopulation, there are at least two breeding habitat areas, each fed by separate springs and/or seeps.*

15 There are at least three separate breeding areas in Subpopulation 1: Lockport Prairie, River South, and the Long Run Seep/Long Run and ComEd Parcel complex. Each of these areas has multiple seeps or springs feeding larval habitat and each will be protected and/or restored under this plan. The groundwater impacts to River South-Fitzpatrick Seep and Lockport Prairie Nature Preserve from future mining expansion will be prevented through the implementation of avoidance measures (i.e. infiltration galleries, infiltration basin, and inundation of Pierce Eich Quarry) (see Sections 5.1.3) and habitat will be restored or enhanced in North, Far North, River North, River, River South-Fitzpatrick Seep, ComEd, and Long Run Parcels using well-established restoration techniques (see Section 5.1.7 and Restoration Plan Set (Appendix F)).

20 3. *CRITERION 3: For each population, the habitat supporting at least three subpopulations should be legally or formally protected and managed for the Hine’s emerald dragonfly, using long-term protection mechanisms such as watershed protection, deed restrictions, acquisition, or nature preserve dedication. In addition, mechanisms protecting the up-gradient groundwatershed will also be in place within 5 years.*

30 Lockport Prairie and Romeoville Prairie are currently under protection by the Forest Preserve District of Will County (FPDWC) as well as by the Illinois Nature Preserve Commission. Long Run Seep is under protection by IDNR and the Illinois Nature Preserve Commission. HMS’ properties, including Fitzpatrick Seep, River South, River South Bluff, River, North, Far North, River North, ComEd, and Long Run Parcels, will all be protected (through a declaration of restrictions that will be converted to a conservation easement if a qualified entity can be found to hold it) as part of this plan (Figure 16, Appendix A). These parcels comprise most of CHU 2 and 7 and their protection, along with the parcels already under protection (listed above), will result in the protection and conservation of all or substantial portions of the four Critical Habitat Units that comprise the Illinois Subpopulation 1 (and contain at least 84-91% of the total Illinois population). Note that some of the ROWs and easements that run through HMS’ properties will not be specifically held under formal land protection contracts, but will be managed with conservation guidelines for operational usage that is intended to benefit the HED and adjacent HED habitat while maintaining operational activities.

45 This plan also includes the implementation of avoidance measures to protect the groundwater hydrology of LPNP and River South from potential impacts of HMS mining operations. Therefore, this plan provides protection from mining to the groundwater of the two largest breeding habitat areas of the Illinois population. The plan also includes supporting partners’ commitments, agreements, and plans to protect surface and groundwater by landowners, land managers, and

governing bodies within the surface watershed and groundwater recharge zones of known HED habitats within the HCP Planning Area (Appendix D).

5.1.3 Measures to Avoid and Minimize Impacts

5

Avoid Mining Parcels

Under this HCP, HMS will not surface mine, but instead will protect the following parcels through a declaration of restrictions: River South, Fitzpatrick Seep, River South Bluff, River, North (except along Route 53), Far North (except along Route 53), River North, ComEd, and Long Run Parcels (Figure 16). The declaration of restrictions allows for the development of up to 12 acres (of the 530.9 acres preserved) for the installation of sub-surface mining ventilation shafts after the permit period. All required permits will need to be obtained for these future development activities prior to installation.

15 *Groundwater Impact Avoidance Measures*

HMS plans to implement a number of measures to avoid potential impacts surface mining may have on groundwater conditions in the habitat of the HED and other Covered Species. The primary measures that will be implemented to avoid potential groundwater-related impacts from quarry dewatering include: 1) the supplement of shallow groundwater in River South Bluff Parcel, and 2) the enhancement of surface water infiltration in the FPDWC property at the southwest corner of Route 53 and Renwick Road. In addition, dewatering in the Pierce Eich Quarry will be terminated after surface mining in that parcel is complete. Natural inundation of the mined area west of Route 53 will occur after the parcel is mined and will provide a long-term avoidance measure for potential groundwater impacts occurring in the future since effects from dewatering will be eliminated.

25

River South Parcel – Groundwater modeling completed for the Romeoville Quarry has indicated that temporary declines in shallow groundwater levels in the vicinity of the River South Bluff Parcel will be likely without avoidance measures from the expansion of the Pierce Eich Quarry. Groundwater is observed to discharge at the ground surface along the toe of the parcel’s eastern slope. Discharged water then drains to River South Parcel and eventually to the Des Plaines River via culverts installed beneath the railroad line or through the coarse gravel ballast below the tracks. A temporary decline in groundwater levels would result in less groundwater discharge at the River South Parcel.

35 Three linked infiltration galleries will be installed in the River South Bluff Parcel to supplement water to various areas of this parcel so groundwater levels remain consistent with current conditions. A linear correlation of groundwater levels to discharge rates has been observed in the parcel (AECOM 2015a), so maintenance of groundwater levels will result in comparable discharge rates to match existing conditions. The rates at which supplemental water will be supplied to the galleries will initially be based on field pilot testing and pumping estimates required during simulations of quarry construction to maintain head levels in the groundwater model. Rates of adding supplemental water will be adjusted based on the results of the preliminary field testing of the infiltration galleries. In addition, water will be added to the galleries if monitoring suggests that head levels are not being maintained within prescribed background water level ranges and calculated quarry influence. Background groundwater levels are summarized in the Groundwater Monitoring Plan included in Appendix G-1.

45

A key element of the infiltration galleries planned for River South Bluff Parcel is the flexibility that they offer, since the rates and volumes of supplemental water can be varied. Additional water may

be added throughout the year (if directed by agencies to do so), so extra water can be supplied to the habitat during hydrologically-stressful periods, including times of regional droughts or unanticipated water declines from anthropogenic sources. Source water for the galleries will be obtained from the Middle Quarry sump. Water quality testing of the Quarry water has already been completed (AECOM 2014b). Additional water sources, including groundwater from the Deep Bedrock Aquifer, will be explored during contingency option evaluations, if needed. Justification for usage of groundwater from the Deep Bedrock Aquifer will be provided to demonstrate the water will not have potential impacts on the covered species and their habitat, if needed.

10 Another key element of the galleries is their simplicity. Source water from the quarry will flow initially into the northern-most gallery via a drop pipe opening to a perforated gallery pipe. The perforated gallery will be installed near the top of the bedrock (approximately 8-10 feet below ground surface) and will allow for percolation to occur in the vadose zone (at the top of bedrock) which mimics natural recharge conditions. Water will flow by gravity to the remaining galleries. 15 Initial flows to each gallery will be determined by the size and location of the gallery. Flow adjustments to each gallery will be made based on field conditions. Additional discussion on the design of the infiltration galleries is included in “River South Infiltration Gallery Design Development: Additional Design Considerations” (AECOM 2015a).

20 Active infiltration in River South Bluff Parcel will provide a temporary means to avoid the potential hydrologic impacts that may be caused by surface mining the remaining reserves in the Pierce Eich Quarry. To permanently avoid these impacts, Pierce Eich Quarry will be allowed to inundate naturally after mining in the parcel is completed to prevent future dewatering. Supplemental water to River South Bluff Parcel will no longer be required once groundwater levels reach baseline 25 levels. Groundwater modeling simulations indicate that baseline levels at River South will be reached within three years of the start of the Pierce Eich quarry inundation. Groundwater level monitoring and active infiltration will continue in the River South Bluff parcel until sufficient data are collected that indicates supplemental water is no longer needed. Data collected during the post-Pierce Eich mining period will be submitted to the overseeing regulatory agencies (e.g. USFWS and 30 IDNR) for their concurrence that decommissioning of the infiltration galleries may occur.

Lockport Prairie Nature Preserve (LPNP) – It is possible that groundwater levels within the recharge zone of LPNP could experience minor impacts from dewatering activities in the Pierce Eich quarry (AECOM 2012). Therefore, to avoid any such possible impacts, measures will be 35 implemented to prevent potential interference of the groundwater recharge zones of the Pierce Eich Quarry and LPNP.

This avoidance measure will involve HMS installing an infiltration pond on property owned by the FPDWC in the southwest corner of Route 53 and Renwick Road. The infiltration pond would be 40 built to detain surface water before it discharges under Renwick Road to the north. Infiltration of the ponded surface water will increase the present volume of groundwater recharging in the area (AECOM 2014b and 2016). The proposed infiltration pond is located just south of the divide between the LPNP and Pierce Eich Quarry recharge areas. Therefore, water at this location will provide a buffer to maintain the current location of the groundwater divide. FPDWC Pond is 45 proposed to be constructed in a former mined area so infiltration will occur directly to bedrock.

The proposed infiltration pond is relatively large (over 13 acres) and would detain significant quantities of runoff emanating from a 186-acre area watershed located west of the pond. Runoff will be conveyed to the infiltration pond via natural drainage (AECOM, 2016). Like the River

South Bluff Parcel Infiltration Galleries, this infiltration pond will not be needed once Pierce Eich Quarry naturally inundates after mining is completed and groundwater levels reach baseline levels.

5 **Additional Avoidance Measures** – Additional avoidance measures will be implemented if the prescribed avoidance measures at the River South Bluff Parcel and FPDWC pond are deemed insufficient in supplementing groundwater supplies or mining/dewatering impacts are greater than expected. The need for additional avoidance (contingency) measures will be assessed through the collection and evaluation of assessment monitoring data and will be part of the adaptive management process as depicted in the monitoring flow charts presented in Appendix G-1. The first step of the adoption of contingency avoidance measures is the evaluation of their effectiveness.

10 Fortunately, numerous alternative avoidance measures have been preliminarily evaluated during the development of the preferred alternative. These measures have been conceptually and numerically evaluated as a pro-active approach in developing alternatives for avoiding potential groundwater impacts. Alternative avoidance measures will be revisited during the evaluation of contingency measures should they be required. Discussion of the monitoring procedures is included in Chapter 6 and in the Groundwater Monitoring Plan provided in Appendix G-1.

15 Several additional/alternative avoidance measures have been identified and preliminarily evaluated for various areas around the Romeoville Quarry. A sample of these potential contingency measures is provided in the groundwater section of Chapter 8 (Section 8.2.9). If any of these contingency avoidance measures are implemented and impact a mitigation area, the impact will be compensated for by restoring or enhancing habitat on Long Run Parcel or another property agreeable to HMS, USFWS, and IDNR.

20 The goal of protecting HED habitat by preventing groundwater impacts will be achieved when the planned above groundwater protection measures, and others discussed in Section 8.2.9, if needed, are implemented successfully and confirmed through monitoring as described in Chapter 6 and Appendix G-1.

25 *Minimizing Impacts and Take in Middle Parcel*

HMS will salvage vegetation and substrates (i.e. soil) of the wet-mesic dolomite prairie and sedge meadow in Middle Parcel (6.01 acres) to re-use in restoring areas in ComEd Parcel (Restoration Plan Set, Appendix F). This will be done to save the highest quality plant community and minimize the impact to the highest quality habitat area in the parcel. This transplant will result in re-establishing this plant community in a parcel (ComEd) that will be restored and preserved in perpetuity under this HCP. The benefits of restoring this parcel are discussed in the HED Mitigation section below.

30 Overburden removal in Middle Parcel, including the wet-mesic dolomite prairie, will start after initial restoration of River, North, Far North, and River North Parcels (i.e. brushing, thinning, and controlling *Phragmites*) is completed. This restoration is anticipated to take two years. This will allow all of the adult HED habitat in Middle Parcel (including the entire wet-mesic dolomite prairie) to remain until restoration of adult HED habitat in these adjacent parcels is completed. In addition, a portion of the restoration of ComEd Parcel will also be completed prior to the wet-mesic prairie transplant. According to the surface mining plan (see Appendix E), the transplant will not start until about three years after HMS receives the ITP and ITA. This should allow time to review and adjust restoration activities in the other HMS properties before proceeding with final impacts to habitat in Middle Parcel. Furthermore, this schedule also will allow for the salvaging of substrates

and desirable native plant materials to take place during the appropriate phenological period to assure the most successful re-establishment of these plant communities in the former scraped and removed spoil pile locations in ComEd property.

Operational Avoidance Measures

5 Several measures will be taken during the mining process and other development activities to avoid taking adult HED or harming remaining habitat (see Mining Plan, Appendix E). These include:

- 10 • Conducting overburden (i.e. vegetation and soil) removal outside flying season (i.e. May 15 to October 15) and active turtle season (March 15 – Oct. 31), if possible. If any overburden removal is conducted during flight season or active turtle season, vehicle speed requirements below will be followed, and turtle impact prevention measures will be taken (see Section 5.2.3) to avoid impacts to covered species.
- 15 • Operating all vehicles at reduced speeds (< 15 mph) within and adjacent to HED habitat during flying season (i.e. May 15 to October 15) (Soluk *et al.* 2014).
- In addition, all trains operated by HMS will also travel at reduced speed (< 15 mph), near or adjacent to habitat during flying season (i.e. May 15 to October 15).
- 20 • Conducting all blasting according to State limits (i.e. air over-pressure (i.e. noise), vibration, and frequency) and a sufficient distance (150 ft) from remaining habitat of Covered Species to avoid direct and indirect (e.g. vibration, dust, and groundwater) impacts. (Distance from remaining habitat does not apply to setback areas or other areas that will not be mined).
- Keeping a vegetation buffer of 50 feet adjacent to the wet-mesic dolomite prairie on Middle Parcel until the prairie is removed for transplant.
- 25 • Using heavy equipment during woody vegetation removal (e.g. Skidsteer or Loaders) outside flying season (i.e. May 15 to October 15), if possible. If not, the speed restriction applies (i.e. <15 mph).
- Using a water truck to wet down areas and control dust on roads adjacent to adult HED habitat.
- Installing or implementing sediment control measures (e.g. silt fence) in areas of soil disturbance.
- 30 • Implementing vehicle fluid spill protection measures (e.g. daily vehicle leak inspections and spill kits) in habitat areas.

Avoidance During Restoration

35 HMS' mitigation will involve restoring, enhancing, and maintaining 354 acres of land on eight parcels (see Section 5.1.7 and Appendix F). A number of measures will be taken during these efforts to avoid taking individual HEDs or impacting habitat. These measures will include:

- 40 • Using existing routes for access and minimizing construction of new access roads.
- Avoiding placing access routes in wetland areas, especially higher quality wetlands, and using alternate routes through degraded uplands instead.
- Using matting (e.g. timber or composite) for temporary wetland crossing (access routes) for heavy equipment and road vehicles.
- Maintaining surface water flow after construction of access roads.
- 45 • Using road vehicles and heavy equipment only in frozen or dry conditions or on access routes.
- Delivering and staging heavy equipment in upland areas outside of rapid recharge areas.
- Placing sediment control measures (e.g. silt fence or wattles) around access routes and other areas of soil disturbance.

- Operating vehicles at low speeds (< 15 mph) during adult HED flying season.
- Accessing on foot (no vehicles) areas within a 20-meter (65 foot) buffer of HED larval habitat year-round as mapped unless agreed upon by USFWS. Foot traffic will be minimized in these areas and stepping in rivulets will be avoided. Foot traffic should be avoided during inundated or heavily saturated conditions.
- Ensuring vehicles crossing larval rivulets will use matting or a bridge constructed from composite matting.
- Removing woody vegetation in larval habitat areas conducted on foot using only hand tools (e.g. chainsaws). Herbicide application done by hand wicking (or other methods approved by USFWS) within a 20-meter buffer of HED larval habitat with aquatic-approved herbicides. Herbicide can be applied to cut woody vegetation within larval habitat buffer by dabbing or painting (or other methods approved by USFWS).
- Applying herbicide by foliar spraying invasive vegetation conducted only outside of the 20-meter buffer around HED larval habitat and with an aquatic-approved herbicide and surfactant.
- Seeding in larval habitat will be done on foot in late fall under dry conditions.
- Creating or modifying rivulets (including hydrology) only in areas unoccupied by larval HED. HED occupied rivulets or other larval habitat areas will be modified only with approval from USFWS).
- Stockpiling and/or burning piles of cut vegetation in upland areas.
- Chipping of woody vegetation will take place in low quality upland areas.
- Conducting prescribed burns outside HED flight season. More restrictions apply to avoid impact to covered turtle species (see Section 5.2.3).
- Properly maintaining vehicles, checking for leaks at the start of each work day, repairing leaks if needed before using vehicles on site. Carrying absorbent materials with equipment or having them accessible at the site to contain spills if they occur.
- Accessing wetland areas with water levels deeper than 12 inches using amphibious vehicles (access would be limited to the timeframe of November 1 - March 14 to avoid covered turtles).
- Crossing wetlands (with <12 inches of standing water) without HED breeding habitat with low ground pressure vehicles (5 pounds per square inch).
- HMS staff and contractors will utilize maps, either electronic or hard copy, showing wetlands and the HED habitat areas, when completing restoration work.

35 More information about the restoration plans and these measures can be found in the Restoration Plan Set (Appendix F). These avoidance measures are consistent with the approved management and restoration activities found in USFWS Section 7 review of HED management and restoration in Illinois (USFWS 2014).

40 The goal of protecting HED habitat by preventing impacts during operations and restoration will be achieved when the above protection and avoidance measures are implemented successfully and confirmed through monitoring as described in Chapter 6.

Public Education and Outreach Program

45 HMS, in conjunction with ComEd and MWGen, designed and implemented a public education and outreach program with Biodiversity Project (now Bluestem Communications), a nonprofit,

environmental communications organization. This group of companies was awarded in 2006 and received in 2009, a planning grant for up to \$370,163 from the USFWS, managed by the IDNR. The companies used this grant money to help fund the studies for this HCP, HCP writing and planning, and implementing projects performed by regional partners to support the HED
5 conservation efforts. This grant program funded projects that focused on groundwater infiltration, stormwater BMPs, and restoration to benefit the HED habitat. This grant program funded eleven projects totaling \$260,733. Descriptions of the projects are listed below:

- 10 1. *Village of Homer Glen, \$18,160*: Restoration of Long Run Creek, which flows through Long Run Seep Nature Preserve and Long Run Parcel. The project included three phases. First, a photographic and physical survey of the creek was completed. Second, creek blockages were removed using municipal employees, volunteers and community service groups. Third, a pilot planting program that will promote infiltration while reducing sedimentation and flooding was implemented. Homer Glen collaborated with the Long Run
15 Creek Watershed Planning Committee on this project.
2. *Village of Lemont, \$31,743*: Planning and retrofitting an existing sod-based stormwater detention pond with native vegetation. Grant money funded the design, implementation, and long-term stewardship of approximately 2.5 acres of naturalized detention in Bambrick Park.
- 20 3. *Village of Romeoville, \$31,835*: Redesigning an industrial area retention basin outflow structure adjacent to Romeoville Prairie. This project improved the outflow structure to prevent the frequent overflow of the basin. The water from this basin feeds Romeoville Prairie so the improvement allowed for better regulation of flow and enhanced water quality to the prairie.
- 25 4. *Lockport Township Park District, \$14,341*: Creation and installation of an HED educational play-piece with educational signage in Brent Hassert Park. The park designed a dragonfly play piece to serve as a constant reminder that the park was designed to help improve the HED habitat. The educational signage included information on the BMPs used in the park, information on the HED and what people can do to help protect it.
- 30 5. *Forest Preserve District of Will County, \$18,117 (project managed by HMS)*: Groundwater studies for Lockport Prairie Nature Preserve. This study, suggested by representatives from the Illinois State Geologic Survey and USFWS, enhanced the models used in groundwater studies from the Lockport Prairie Nature Preserve and provided more accurate information on the hydrology of the area.
- 35 6. *Forest Preserve District of Will County, \$40,000*: This project extended invasive species removal and control already initiated at Dellwood Park West onto Lockport Prairie East to begin the restoration and enhancement of these rare natural community remnants. The FPDWC hired contractors to remove invasive trees and shrubs across roughly 35 acres through cutting and burning to eliminate competition and allelopathic conditions for
40 desirable native species, with follow-up herbicide applications to suppress re-sprouts. Invasive and weedy herbaceous species were also treated with herbicides to allow native populations to re-colonize appropriate habitat areas.

- 5 7. *Lewis University, \$68,537*: Rainwater collection system for the Power House at Lewis University in Romeoville, Illinois. The system was designed and installed to collect approximately 200,000 gallons of water per year. The water is used for irrigation and cooling tower make-up water. This project reduced Lewis University's dependence on the aquifer by approximately 200,000 gallons per year.
8. *Illinois Nature Preserves Commission, \$15,000*: This project included removal of invasive threats and restoration/maintenance of pristine dolomite prairie in Long Run Seep Nature Preserve.
- 10 9. *Village of Lemont, \$18,000*: The Village of Lemont was a coordinating partner in the development of the Long Run Creek Watershed Plan. The Watershed Plan requires a public education and outreach plan. The Village used the grant to go above and beyond the federal requirements to develop a strategic campaign and to implement a pilot project identified in the final education plan. The pilot project focused on homeowners in the watershed and behavior changes they can make that will ultimately increase infiltration and support the HED habitat needs.
- 15
- 20 10. *Lower Des Plaines Ecosystem Partnership, \$5,000*: Grant money was used as matching funds for the development of the Long Run Creek Watershed Plan (funded by a Section 319 grant from the IEPA). The Watershed Plan is an important comprehensive plan for Long Run Creek, which supports significant HED habitat. The Watershed Plan will guide and encourage the local jurisdictions in the watershed to adopt practices and ordinances that protect the waterway and adjacent habitat.
- 25 11. The other program funded by this grant included an education and outreach program designed and implemented with Biodiversity Project. The major target audiences for this public education and outreach program were homeowners, municipal staff and construction professionals in the Planning Area. Public and private landowners in the groundwater recharge areas play an important role in maintaining the groundwater that feeds the HED larvae habitat. The education and outreach program focused on actions that will help increase the amount of water infiltration in the recharge areas.
- 30 The homeowner outreach was performed primarily through direct, person-to-person conversations at public events attended by Biodiversity Project staff. The goal of the homeowner outreach was not just education on the species, but to also help citizens make behavior changes that would increase the water quality and recharge quantity from their homes with the understanding that clean, plentiful water is important for the dragonfly as well as the community at large. The direct
- 35 homeowner outreach events included an educational booth displayed at festivals, farmers markets and community events featuring:
- Three large displays showing the local area, habitat locations, information about the HED and actions homeowners can take to help.
 - Brochures containing similar information about what people can do, including information on learning more about rain gardens, pesticide use, and rain barrels.
 - A craft project for kids to attract families to the booth and engage them while staff talked to the adults.
 - A pin or magnet for people to take home with an HED illustration.
- 45

Additional public outreach included:

- Information for supporting project partners and municipalities to include on their websites and in municipal newsletters.
- Newspaper articles picked up by local papers about the re-grant program, the HED, and prairie tours.
- Brochures distributed through supporting project partners and other organizations.
- Educational tours of Lockport Prairie Nature Preserve led by biologists and FPDWC staff focusing on the endangered species and habitat.

Outreach to developers was primarily performed via a toolbox developed for supporting project partners and municipalities, which includes material they can distribute in their planning and permitting departments. The toolbox focuses on the BMPs identified by Applied Ecological Services, Inc. (AES) as the most beneficial in the recharge area (e.g. vegetated swales, buffer strips, naturalized detention, porous pavement, open spaces, and native landscaping). The toolbox included:

- Case studies and factsheets of BMPs that are important for the recharge area.
- PowerPoint presentation on the HCP and the HED.
- Communication recommendations about the HED, BMPs, and recharge area.
- Online resources for additional information on BMPs.
- An image bank of Covered Species.
- Articles for municipal newsletters.

HMS has also been involved with other public efforts in the area, including attendance at the Lower Des Plaines Ecosystem Partnership meetings and contributing to the development of the Long Run Creek Watershed Plan. HMS contributed to the watershed plan by participating in stakeholder meetings and funding a portion of the project.

HMS collaboration with Supporting Partners

HMS was instrumental in recruiting various municipalities and large public or private landowners in the Planning Area (known as “Supporting Partners”) during the HCP planning process. HMS and Biodiversity Project worked with these partners to identify ways they could protect or enhance groundwater in recharge areas or benefit the HED habitat in other ways. All of the Supporting Partners listed in Section 1.3 have made commitments to take steps on their property or within their jurisdiction to protect or enhance groundwater or improve habitat. Some of these partners also completed grant-funded projects described above. Their commitments and a description of their role in the HCP are found in Appendix D.

Furthermore, communication and coordination are important to the successful implementation of this HCP. HMS will coordinate its planned activities along NRG Energy’s rail line and ComEd’s electrical distribution and transmission ROWs with these partners to facilitate its restoration goals and objectives while at the same time ensuring these partners’ safe operations.

5.1.4 Calculation of Incidental Take

After evaluating planned activities and avoidance and minimization measures, HMS identified potential direct and indirect impacts to the HED and its habitat. This section provides anticipated

take estimates for adult and larval HED habitat. All estimates of larval and adult HED habitat acreages are based on the current HED habitat map derived from the most currently available GIS data (see Tables 5 & 6). The location of HED habitat (as mapped by D. Soluk and/or K. Mierzwa) is shown on Figures 9.0-9.7 of Appendix A and is categorized as follows:

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- HED Larvae Occupied Rivulets – Rivulets that contain all HED Larval Primary Constituent Elements (PCEs), have been sampled at least one time between 1996 and 2011 (or since), and have been documented as supporting HED larvae during one or more sampling events. Average width of rivulet channels is 1.0 foot, and lateral movement of larvae outside of the rivulet channel is assumed to extend up to 0.5 meters from the center of the channel for a total occupied width of one meter.
- HED Larvae Habitat Areas – Larval habitat areas lack well-defined rivulet channels but are influenced by subsurface flow or upwelling. These areas contain all HED Larval PCEs, have been sampled at least one time between 1996 and 2011 (or since), and have been documented as supporting HED larvae during one or more sampling events.
- Undocumented Rivulets – Rivulets that contain all HED Larval PCEs, have been sampled at least one time between 1996 and 2011(or since), but have not been documented as supporting HED larvae.
- Historic HED Larvae Habitat Areas – Areas that contained all HED Larval PCEs at one time and were documented as supporting HED larvae 15 or more years ago. These areas no longer contain all HED Larval PCEs and have been sampled one or more times between 1994 and 2011 (or since) but have not been documented as supporting larvae in the last 15 years. Or an area or rivulet that has been documented as supporting HED larvae in the last 15 years, but conditions of the area have changed since the documentation to make it unsuitable for HED larvae.
- HED Adult Habitat Areas – Adult habitat areas contain both of the HED Adult PCEs. The areas include all open wetland and adjacent open upland habitats within CHUs. Developed and hardscape areas (e.g. roads, railroads, parking lots, industrial sites and fill) are excluded.

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A description of the process used to determine and map HED habitat is located in Appendix B. A summary of HED habitat types and their respective acreages are shown in Tables 5 and 6 below.

Table 5. HED Adult Habitat Acreages.

Critical Habitat Unit	Adult Habitat (acres)	CHU Area (acres)
CHU 1	231.8	351
CHU 2	203.1	439
CHU 3	260.3	366
CHU 4	311.8	575
CHU 5	202.5	293
CHU 6	177.3	430
CHU 7	139.1	447
Total	1,525.9	2,901

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Table 6. HED Larval Habitat Acreages within the Critical Habitat Units (CHUs).

Critical Habitat Unit	Parcel	Larval Habitat Name*	Larval Habitat Category	Occupied Larval Habitat (acres)	Historic Larval Habitat (acres)
CHU 1	Lockport Prairie	2S	Occupied	0.118	-
CHU 1	Lockport Prairie	1 FS	Occupied	0.004	-
CHU 1	Lockport Prairie	2 FS	Occupied	0.004	-
CHU 1	Lockport Prairie	1S	Occupied	0.057	-
CHU 1	Lockport Prairie	1S Upper	Occupied	0.062	-
CHU 1	Lockport Prairie	2N	Occupied	0.045	-
CHU 1	Lockport Prairie	1N	Undocumented	None	-
CHU 2	River South	South Meadow	Historic	None	0.474
CHU 2	Middle Parcel	Middle Parcel	Historic	None	1.559
CHU 2	River South	0.5, 1.0, 4.0	Undocumented	None	-
CHU 2	River South	2.0, 2.5	Occupied	0.079	-
CHU 2	River South	Emerald Meadow	Occupied	0.107	-
CHU 2	River South	3.0	Occupied	0.031	-
CHU 2	River South	5.0	Occupied	0.020	-
CHU 2	River South	6.0	Occupied	0.021	-
CHU 3	Romeoville Prairie	RM-SPRG1, RMST1	Undocumented	None	-
CHU 4	Keepataw	KS2T5 PLE	Occupied	0.008	-
CHU 4	Keepataw	KPE1	Occupied	0.002	-
CHU 4	Keepataw	KPE2	Occupied	0.015	-
CHU 4	Black Partridge	BPE1S	Undocumented	None	-
CHU 5	Waterfall Glen	WG2S	Occupied	0.014	-
CHU 5	Waterfall Glen	WGPstr1-4	Undocumented	None	-
CHU 6	McMahon Woods	McMahon Str 1	Occupied	0.027-0.033	-
CHU 6	McMahon Woods	McMahon Str 2	Occupied	0.009-0.014	-
CHU 6	McMahon Woods	McMahon Str 9	Occupied	0.012	-
CHU 6	McMahon Woods	McMahon Str 11	Occupied	0.003	-
CHU 6	McMahon Woods	McMahon Str 3-8, 10, 12	Undocumented	None	-
CHU 7	Long Run Parcel	LPO Str1	Historic	None	0.012
CHU 7	Long Run Parcel	LPO Str1	Undocumented	None	-
CHU 7	Long Run Seep	Long Run Seep Str	Occupied	0.025	-
			Total (acres)	0.674	2.045

*As designated by K. Mierzwa and D. Soluk in various sampling reports.

HMS Calculation of Incidental Take

- 5 Under HMS' preferred alternative, surface mining will directly impact the habitat present in Middle Parcel only. Under the proposed mining plan, over a period of about 20 years, the entire surface aggregate resources of Middle Parcel will be mined to the limits of mining allowed under the

Illinois Mining Regulations (62 IAC 300.110) (~115 acres) (Figure 15.1, Appendix A). In addition, the frontage areas (along Rt. 53) of North and Far North Parcels contain adult HED habitat and will be developed, and a very small amount of adult HED habitat also will be impacted in ComEd Parcel during restoration activities.

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Take and Habitat Impact/Take Estimates - HED

As a result of surface mining Middle Parcel, at most 40.81 acres of adult HED habitat and no larval habitat will be impacted/taken in Middle Parcel. In Middle Parcel, about 40.81 total acres of adult HED foraging habitat (including 6.01 acres of wet dolomite prairie and sedge meadow, 22.97 acres of *Phragmites* marsh, 0.1 acres of cattail marsh, 11.3 acres of upland old field vegetation, 0.30 acre of mesic dolomite prairie, 0.04 acres wet prairie, and 0.08 acre each of reed canary grass and cattail marsh) will be lost (Figure 17, Appendix A). All but about 6.5 acres of this habitat is low quality. Within this area is about 1.56 acres of historic larval habitat (Figure 9.2, Appendix A). No larval habitat is thought to occur on Middle Parcel because no evidence of successful larval production has been found on the property since 1997 (Cashatt and Sims 1993; Cashatt et al. 1993; Vogt and Cashatt 1999; Mierzwa and Webb 2010; Mierzwa 2013). Observations of territorial males, indicating that there may be attempts by this species to breed, is the only evidence of breeding that has been documented from this parcel over the past 20 years. During this time there has been no evidence of successful population recruitment (larvae, exuviae, tenerals) (Mierzwa and Webb 2009). Construction of an access route in Long Run and ComEd Parcels is expected to result in a very small impact to adult HED habitat (0.39ac) (no larval or suspected larval habitat areas will be impacted). In addition, at most, 8.40 acres of adult HED habitat will be impacted when the frontage areas of North and Far North Parcels are developed (also low quality old field vegetation and habitat). Thus, a total of 49.6 acres of adult HED habitat is expected to be impacted by HMS activities in the permit area.

Pierce Eich Quarry is located west of Route 53 and is within the estimated groundwater recharge zone buffer for River South Parcel and the two-mile recharge area buffer for both River South Parcel and LPNP (Figure 4). Continued surface mining of Pierce Eich Quarry (35 ac remaining of 206 ac total) and the remainder of Middle Quarry (1.3 ac) is not expected to have any groundwater impacts (i.e. reduction in groundwater levels or discharge rates) on the habitat in River South and LPNP due to the implementation of groundwater avoidance measures. The avoidance measures and their effectiveness are summarized in the previous section (Section 5.1.3), and are detailed in several AECOM (2013b, 2014a, 2014b, 2016, 2017, and 2019) and HMS (2017 and 2019) studies. Similarly, surface mining of Middle Parcel (115 ac) is also not expected to have any groundwater impacts to these two parcels since it will be completed after Pierce Eich Quarry is no longer dewatering the groundwater. Mining Middle Parcel, however, is expected to affect the groundwater levels in adjacent and nearby parcels (i.e. North, Far North, and River Parcels). Impacts to North and Far North will be reduced by the inundation of Pierce Eich Quarry. In addition, the wetlands in all three parcels are heavily influenced by surface water which will help prevent any impacts to adult HED habitat. Furthermore, habitat on these three parcels will be improved through invasive species removal. RPNP is located a sufficient distance and direction from all surface mining operations that changes in groundwater levels and subsequent habitat impacts are not anticipated.

River South and LPNP contain both larval and adult HED habitat and are the two most productive breeding areas in Illinois (and the Southern Recovery Unit). Lockport Prairie accounts for 54-56% of the Illinois population and River South accounts for 30-35% of the population - combined they account for 84-91% of the entire state population. Romeoville Prairie does not have any confirmed larval habitat. Mining East Parcel (36 ac) is not expected to have any groundwater impacts to these

parcels or any other habitat area in the Planning Area because it is hydraulically isolated from these areas by the Des Plaines River on the west and two canals on the east. These surface water features provide hydraulic controls, since they are in direct connection with the Silurian Bedrock.

5 HMS' proposed activities will not impact the Covered Species or their habitat in any other properties in the HCP Permit or Planning Area. All anticipated impacts described above will be mitigated for through the restoration, enhancement, maintenance, and protection of habitat in other HMS parcels in the Permit area (see Mitigation – Section 5.1.7 and Appendix C, Table C-9).
10 Surface mining operations in Middle Parcel will eventually directly impact all wildlife habitats on Middle Parcel. However, restoration measures implemented on the other HMS parcels included in the mitigation package will greatly improve overall habitat quality for wildlife.

Wetlands

15 The proposed surface mining activity in HMS' Middle Parcel will impact a total of 29.74 acres of wetlands. In Middle Parcel most of these are highly degraded or low-quality wetlands (i.e. 22.97 acres invaded by *Phragmites*, including scraped areas)) (Figure 17, Appendix A). Impacts to the 6.01-acre wet-mesic dolomite prairie will be avoided by carefully removing and transplanting it as part of HMS' mitigation. Aside from 0.39 acres of impacts to wetlands on ComEd Parcel, no wetlands will be lost on any other HMS properties included in this HCP. HMS submitted a permit
20 application to the U.S. Army Corps of Engineers and other regulatory agencies for all anticipated wetland impacts associated with this HCP on January 31, 2019 and later provided additional information requested by the USACE in an April 29, 2020 letter.

Summary Incidental Take

25 This analysis indicates that under the Preferred Alternative total impacts will result in the loss of approximately 49.6 acres of adult HED habitat: adult foraging and/or dispersal habitat in Middle, North, Far North, and ComEd Parcels. This loss represents 3.3% of the known adult HED habitat (49.6 of 1526 ac) in CHUs in Illinois (Figure 9.0, Appendix A). (Note: There is known HED habitat in the lower Des Plaines River Valley outside of CHUs (e.g. Lockport Prairie East and Dellwood
30 Park West.) There will be no loss of adult HED habitat elsewhere in the HCP Planning Area. There are no anticipated impacts to larval habitat as the result of HMS planned activities. All potential groundwater impacts to larval habitat will be prevented through the use of avoidance measures described above in Section 5.1.3 (AECOM 2013b, 2014a, 2014b, 2015a, 2015b, 2015c, 2016, 2017, 2018, 2019). (Note: Only 40.1 acres of adult HED habitat on Middle Parcel is within the CHU
35 boundary and 0.7 acres is outside the boundary (see Figure 17). This reduces the loss of habitat within the CHUs to 48.9 acres or 3.2%. The larger number is used in this document to ensure that all habitat impacts are accounted for and permitted.)

5.1.5 Impact of Take

40 All but two of the HED habitat sites (both adult or adult and larval) in Illinois are found in the lower Des Plaines River Valley and are within or near the seven designated Critical Habitat Units (USFWS 2007 and 2010). Based on current HED habitat mapping (Figures 9.0-9.7; Appendix A), this HCP estimates that there are 1,525.20 acres of known adult HED habitat and 0.67 acres of
45 suitable HED larval habitat in the river valley (within the CHUs). Numerous surveys of adult and larvae HED have been conducted at many of the known habitat locations. Population estimates based on these studies vary widely from year to year and from site to site. The most recent estimate of the HED adult and larval populations within the river valley, based on a review of nearly all HED studies conducted in Illinois, is 165 adults and 2,063 larvae (Soluk and Mierzwa 2012). These

HED habitat acreages and population estimates were used as the basis for the impact of take analysis.

HMS Impact of Take

5 HMS' Covered Activities will result in the loss of 49.6 acres of adult HED habitat in Middle and portions of North, Far North, and ComEd Parcels which is 3.3% of the known adult HED habitat (49.6 of 1,525 ac) (Figures 9.0, 9.2, and 17, Appendix A). No direct impacts or indirect groundwater impacts to larval HED habitat are anticipated from HMS' planned activities and, therefore, no impact to or take of larval habitat is expected.

10 The take calculation above describes the reasonable worst-case estimate of take in individuals and also the maximum acreage of known and suitable HED habitat impacted by HMS, in instances where impacts rise to the level of mortality, harm, or harassment. Harm may include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (16 U.S.C. 1532(19))." The take analysis builds on the take calculation by further explaining the anticipated impact this reasonable worst-case take is anticipated to have on the HED at the individual and population level.

20 *Individual Level*

Based on the assessment of the potential biological impacts and take (Section 5.1.4) in this HCP, Covered Activities identified to cause take (direct or indirect) (that were not avoided or self-mitigating) include only the removal of adult HED foraging habitat and movement/dispersal corridor due to the surface mining of Middle Parcel, development of the far western portion of North and Far North Parcels, and construction of an access route in ComEd Parcel. These activities will result in the loss of 49.6 acres of adult HED habitat.

30 HED larvae are very unlikely to be found in Middle Parcel (Mierzwa and Webb 2012a and Mierzwa 2013), in the impacted areas of North and Far North Parcels (upland frontage area along Rt. 53), and ComEd Parcel (two-track road through degraded wetland). Thus, surface mining and development of these parcels are not anticipated to cause any direct take of larvae or larval habitat. In addition, potential groundwater impacts to larval habitat areas in nearby parcels (i.e. River South and LPNP) from mining Pierce Eich will be avoided through implementation of avoidance measures (AECOM 2013b, 2015a, 2016, 2017, and 2019 and HMS 2017 and 2019). Therefore, no take of the HED larvae or larval habitat is anticipated from HMS' activities.

40 Direct mortality to the HED from mining operations on Middle Parcel will be avoided by completing operations (e.g. vegetation and soil removal) in habitat areas outside the HED adult flying season or using vehicles at reduced speed if operations occur during the flying season. Some mining activities that occur outside habitat areas (e.g. blasting and hauling of rock) will be conducted during adult HED flight season but will be completed in a manner or location that results in negligible or insignificant impact and thus does not result in take (see Section 5.1.3).

45 However, removal of habitat in Middle Parcel and the western portion of North and Far North Parcels (done outside adult HED flight season) will result in a reduction of foraging and perching/resting habitat and will displace adult HED that would have used that habitat the next season. This will result in indirect impacts. These displaced HED are expected to use the remaining on-site suitable habitat or habitat found on adjacent parcels. Until all overburden (i.e. vegetation and soil) is removed from Middle Parcel or developed in North and Far North Parcels, the HED

could utilize the remaining habitat areas in these parcels. However, after a significant amount of the vegetation is removed, adult HED will need to utilize habitat on adjacent parcels (i.e. River, North, Far North, River North, and ComEd ROW). Vegetation quality in adjacent parcels is as good as much of the adult HED habitat removed from Middle Parcel, but these parcels have less of the best quality community (e.g. wet-mesic dolomite prairie). However, with respect to foraging, the HED respond to habitat structure rather than species composition, as evidenced by frequent foraging over reed canary grass at River South and avoidance of *Phragmites* monocultures on the eastern half of Middle Parcel. The adjacent parcels provide the same type of habitat as Middle Parcel with vegetation appropriate for foraging, perching, and resting but not for breeding. In addition, adult HED habitat on River and North Parcels will be expanded and improved through enhancement of vegetation structure by removing *Phragmites* and invasive woody vegetation. These adjacent parcels will be used as dispersal corridors that will allow the HED to reach more distant habitat (i.e. in Romeoville Prairie, River South Parcel, or ComEd/Long Run Parcels). Thus, all the same habitat functions provided by Middle Parcel are provided by adjacent parcels. The loss of habitat on ComEd/ Long Run Parcel from the installation of an access road is very small (0.39 acres) and will be limited to the work area with the implementation of avoidance measures (see Section 5.1.3) and thus is not expected to have any perceptible impact on HED behavior.

The impact of removing habitat from Middle Parcel and the west ends of North and Far North Parcels on HED behavior may depend in part on the carrying capacity of nearby habitat. Transient animals may see little effect, since they do not pause for very long and tend to avoid territorial interactions. Foraging animals spend longer intervals in one area, and if adjacent habitat is not extensive enough to support all foraging animals then there could be an increase in energy expenditure as dragonflies seek out other habitat areas at greater distances. Given the long-range flight capabilities of some dragonflies and the documented minimum 5.4 km dispersal distances of the HED (Mierzwa (editor) 1995), energy expenditure alone is not expected to be an issue. However, a reduction in available food coupled with increased energy expenditure could stress the HED. In addition, some animals could disperse for long distances in directions away from suitable habitat, thus effectively removing themselves from the breeding habitat, or could be forced to cross roads or other areas where there is increased risk of mortality, injury, or predation. This, along with a reduction in available food, would constitute harm or harassment, and therefore take. However, it is important to note that very few HED territorial interactions have been observed in recent years at Middle or River Parcels, suggesting that those areas are not presently at or near carrying capacity for foraging activity.

Population-Level

As described above, individual adult HED may experience more stress and a slightly increased chance of mortality as a result of HMS' mining activities. For the viability of the species, it is important to know how these potentially adverse effects to individual HED affect the overall health and viability of the population in the lower Des Plaines River Valley (i.e. the largest Illinois population of the Southern Recovery Unit). Middle Parcel is in the southern half of the string of HED habitat sites on the west side of the Des Plaines River and just north (~3500 feet) of the two most productive breeding sites in Illinois, (River South and Lockport Prairie) which account for 84-91% of the Illinois population.

The analysis that follows describes impact of the incidental take requested on HED at the population level.

HED habitat (adult and larval) is found in or near seven federally designated Critical Habitat Units located in the lower Des Plaines River Valley (USFWS 2005, 2007, and 2010). Based on existing vegetation mapping and aerial photo interpretation, approximately 1,525 acres of adult HED habitat have been mapped within the lower Des Plaines River Valley (within CHUs) (Figure 9.0-9.7, Appendix A). There have been numerous surveys of adult and larvae HED conducted at a number of these known habitat locations. Population estimates based on these studies vary widely from year to year and from site to site. The best current estimate of HED adult and larval population within the river valley is 165 adults and 2,063 larvae (Soluk and Mierzwa 2012).

HMS anticipates that “take” in the form of mortality (slight increase in chance based on stress), harm and harassment will occur at only one location as a result of proposed activities - Middle Parcel. Based on recent studies, habitat that may be lost in North and Far North does not appear to be used often by adult HED (Mierzwa and Webb 2014 and 2016). Three adult HED individuals will be impacted per year (entirely through displacement) at Middle Parcel once all habitat is removed. Three individuals is about 1.8% (3 of 165) of the estimated annual adult HED population in the lower Des Plaines River Valley. However, this level of impact will never occur because mitigation measures designed to offset this take (i.e. habitat restoration on nearby parcels) will start to be implemented right after the permit is issued and will be completed before all habitat impacts on Middle Parcel have taken place. A total of approximately fifty acres of adult HED habitat will be lost in all three parcels which is 3.3% of the known HED habitat (49.6 ac of 1,525 ac) within the lower Des Plaines River Valley (within the Critical Habitat Units). Again, no impacts to larval habitat are anticipated from proposed mining or development because all indirect groundwater impacts to larval habitat areas (i.e. River South and Lockport Prairie) will be avoided through avoidance measures included in the HCP (see Section 5.1.3). Therefore, take at Middle Parcel (as well as North and Far North Parcels) is expected to have a very limited effect on the overall health and viability of the HED population within the lower Des Plaines River Valley. Consequently, no impacts are expected range-wide to HED populations in other states.

Genetic-Level Implications

As discussed above, HMS’ planned activities are expected to have a very limited effect on the overall health and viability of the HED population in the lower Des Plaines River Valley. Based on recent genetic analyses by Dr. Meredith Mahoney (pers. comm. 2012), of 141 samples of Hine's emerald dragonfly tissue analyzed for mitochondrial DNA (mtDNA) variation, there are 21 haplotypes rangewide, with up to six differences (1.1%) among them. Missouri exhibits the greatest genetic diversity across the range of the species with 13 of the 21 haplotypes found in Missouri including 10 that are unique to the state; whereas, Michigan has been found to contain only one haplotype and Wisconsin has four haplotypes.

Hine’s emerald dragonfly sites in Illinois had previously been thought of as being the most genetically diverse (Purdue et al. 1996) prior to the discovery of sites in Missouri (M. Mahoney, pers. comm. 2012). There are six different haplotypes (genetic variants) that have been found in Illinois, four of which are unique to Illinois, with up to five differences (0.92% divergence) among them. The differences (number or percentage) are the maximum observed base pair substitutions between haplotype pairs looking either range wide or just within Illinois or other regions. Some haplotype pairs have only one or two differences between them. The four unique haplotypes were all found in sites (Lockport Prairie Nature Preserve, River South and Middle Parcels, and Romeoville Prairie) within a close proximity (approx. 4.25 miles (6.84 km)) of each other. The haplotypes unique to Illinois are B, C, E, and F. Alternatively, haplotype D, which is found across the species range, has not yet been found in Illinois, though two other widespread haplotypes (A

and G) do occur. Analyses of museum samples from extirpated Ohio populations found genetic variants that are not seen in other, extant, populations (Purdue et al., 1996, and Mahoney pers. comm. 2012). Range wide analysis showed little geographic structuring of genetic variation and most variation (77-86%) is within states (Mahoney pers. comm. 2012). Due to the relatively high genetic diversity and unique haplotypes in HED populations in Illinois and Missouri, the long-term viability of the species range-wide would be compromised if the genetic diversity of these populations is threatened.

A more recent study, however, has revealed more geographic structuring of genetic variation. An assessment of the genetic structure of Hine's emerald dragonflies based on microsatellite DNA analysis of samples from sites in Illinois, Wisconsin, and the Upper Peninsula of Michigan revealed a clear spatial pattern for this species indicating five separate populations within the study area: one population in Illinois; a second in Ozaukee County (Cedarburg Bog), Wisconsin; a third in southwest Wisconsin (Lower Wisconsin River); a fourth that is in Kewaunee and Door Counties, Wisconsin, and a fifth population in the Upper Peninsula of Michigan (Monroe and Britten 2014). The assignment of individual sites to populations reflects the information from this research as well as the known flight distance of the species (USFWS 2013). Based on mark recapture studies Hine's emerald dragonflies can fly at least 3.4 miles (5.5 km) (Mierzwa et al. 1995a; Cashatt and Vogt 1996) but most likely not further than 30 miles (48.28 km) (D. Soluk, pers. comm. 2012).

While most populations in the southern portion of the species range are believed to be smaller, there is greater genetic diversity within the southern populations which makes them extremely important to the survival and recovery of the species. Alternatively, the populations in the northern portion of the species range are larger yet have less genetic diversity. This is supported by Monroe and Britton's (2014) study that found allelic richness is greatest in the Illinois population and lowest in the two northern populations found in Door Peninsula, WI, and the Upper Peninsula, MI. This study also revealed most genetic variation is within populations (91%) with very little genetic variation among sites within populations (3%) and among populations (6%). However, this level of genetic diversity may not be maintained by regular gene flow in the future due to the loss of stepping stone habitats that must have existed previously based on the species dispersal capabilities.

The vulnerability of Hine's emerald dragonfly populations in the South and the species as a whole, to effects from demographic and genetic stochasticity, may be increasing due to the severity of the threats to the small populations. Demographic stochasticity can cause small populations to vary widely in size. Genetic stochasticity means random changes in a population's genetic makeup that can have deleterious effects on the ability of individuals to survive and reproduce. A drastic reduction in population size can exacerbate the effects of genetic stochasticity or can lead to the further decline of a population to extirpation. As a population loses individuals, it may lose genetic variation, which may reduce the species' fitness or ability to cope with environmental change. So, while the southern populations may currently contain genetic diversity that may be necessary for the species to survive and adapt in a changing environment, the potential for the Southern populations to become extirpated is compounded by several direct and indirect threats and by small population sizes, which compromises the viability of the species rangewide.

These studies reveal the importance of the Illinois population to maintaining the genetic diversity of the species range-wide as well as the importance of maintaining the size of the population to prevent the loss of genetic diversity and reduced fitness of the population. Almost the entire Illinois population is found within and adjacent to the lower Des Plaines River Valley and it contains three sub-populations. Subpopulation 1 is located within the Planning Area, while Subpopulations 2 and 3 are located north and northeast of the planning area, respectively. Subpopulation 1, which

includes the Permit Area, contains by far the greatest number of individuals and the greatest genetic diversity (i.e. all 4 unique haplotypes) of the Illinois populations. Therefore, Subpopulation 1 is critical to maintaining the genetic diversity and viability of the Illinois population.

5 Further, maintaining connectivity between habitat sites within this subpopulation is very important
in preserving its genetic diversity as well as that of the entire Illinois population. Surface mining
Middle Parcel will reduce connectivity within the subpopulation and lower Des Plaines River
Valley. This could result in decreased gene flow which could lead to inbreeding depression and
reduced fitness of the population. Therefore, HMS will improve connectivity around Middle Parcel
10 by preserving and expanding habitat on adjacent parcels to create dispersal corridors that facilitate
adult HED movement. River, North, Far North and River North Parcels (150.5 acres) will be
preserved, and habitat will be restored and expanded (74.8 acres) on all four Parcels. These genetic
studies also point to the importance of maintaining current breeding locations (larval habitat) of
Subpopulation 1. HMS will avoid all impact to the groundwater hydrology of River South and
15 Lockport Prairie (which account for 84-91% of the Illinois population) or any other larval habitat
area from its continued mining operations through the implementation of avoidance measures (i.e.
infiltration galleries and basins). In addition, HMS will be greatly expanding habitat adjacent to
another breeding location within this subpopulation (ComEd and Long Run Parcels). Due to these
avoidance and mitigation measures, HMS concludes that the anticipated impacts from its Covered
20 Activities do not pose a significant risk to the HED population or its genetic diversity and fitness.

5.1.6 Effects on Critical Habitat

25 Critical Habitat was designated for the HED in September 2007 (and revised in April 2010)
(USFWS 2007 & 2010). Seven Critical Habitat Units were designated in Illinois, all in or near the
lower Des Plaines River Valley and four are included in the HCP Planning Area (Figure 4,
Appendix A) (USFWS 2007 & 2010). In determining which areas to designate as Critical Habitat,
the USFWS identified Primary Constituent Elements (PCE) which they determined are necessary to
meet the biological needs of the species. PCEs are those physical and biological features that are
30 essential to the conservation of the species, and within areas occupied by the species at the time of
listing, that may require special management considerations and protection. To be designated
critical habitat for the HED, an area must contain sufficient PCEs to support at least one life history
function. Seven PCEs were identified for HED habitat: five for larval habitat and two for adult
habitat. These are listed below:

35 *For egg deposition and larval growth and development (larval habitat):*

- 1) Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate
(predominantly dolomite and limestone bedrock);
- 40 2) Calcareous water from intermittent seeps and springs and associated shallow, small, slow
flowing streamlet channels, rivulets, and/or sheet flow within fens;
- 3) Emergent herbaceous and woody vegetation for emergence facilitation and refugia;
- 4) Occupied burrows maintained by crayfish for refugia; and
- 45 5) Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies,
midge larvae, and aquatic worms.

For adult foraging; reproduction; dispersal; and refugia necessary for roosting, resting, escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage) (adult habitat):

- 5 6) Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 ft (100m)) of bordering shrubby and forested areas with open corridors for movement and dispersal; and
- 7) Prey base of small, flying insect species (e.g. dipterans).

10 The following statements from USFWS regarding the designation of critical habitat were taken into consideration in determining potential effects on critical habitat from activities:

15 *To the greatest extent possible, we avoided including developed areas containing buildings, rail lines, electrical substations, and other urban infrastructure within critical habitat units. Where we have not been able to map out these structures we have excluded them by text. As stated in this rule, critical habitat does not include human-made structures existing on the effective date of a final rule not containing one or more of the primary constituent elements (see definition of ‘primary constituent elements’ in subsequent section). Therefore, human-made structures including utility poles, power lines, rail lines, and the generating station*

20 *are not included in the critical habitat designation (21398 Federal Register / Vol. 75, No. 78 / Friday, April 23, 2010 / Rules and Regulations).*

25 *When determining critical habitat boundaries, we made every effort to avoid including developed areas such as buildings, paved areas, and other structures and features that lack the PCEs for the species. The scale of the maps we have prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of all such developed areas. Any such structures and the land under them inadvertently left inside critical habitat boundaries shown on the maps of this final rule are excluded from this rule by text and are not designated as critical habitat. Therefore, Federal actions limited to these*

30 *areas would not trigger Section 7 consultation under the Act, unless they affect the species or PCEs in critical habitat (Federal Register /Vol. 75, No. 78 / Friday, April 23, 2010 /Rules and Regulations 21409).*

35 The following section discusses the effects of HMS’ proposed activities on CHUs within the Planning Area. All CHUs that are impacted or could be impacted are discussed below. For Parcels with expected impacts, each PCE is listed and discussed as to whether it exists in the parcel, how it will be impacted, how impacts will be avoided and minimized and how impacts will be mitigated.

HMS Effects on Critical Habitat

40 *Middle Parcel (CHU 2)*

Middle Parcel is the only designated Critical Habitat (CHU 2) that will be mined. Pierce Eich, Middle Quarry, and East Parcel will be mined but are not in designated Critical Habitat, and no mining activities are planned on any other HMS parcels in Critical Habitat. Middle Parcel, however, does not contain all of the PCEs and the PCEs that are present are only found in limited

45 areas of the parcel.

Larval Habitat PCE

1. Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock):

5 There are approximately 30 acres of wetlands on Middle Parcel, but approximately 5 acres of wetlands contain *Phragmites* growing on previously scraped areas (i.e. very little soil with no organic matter development). Almost all the non-wetland areas have been scraped, filled, or altered in some way by past activities. Therefore, PCE #1 exists on no more than 25 acres of the parcel. A portion of the hydric soils on this parcel (6.01 acres in the wet-mesic dolomite prairie) will be salvaged and transplanted to a mitigation parcel (ComEd). The remaining 19 acres will be lost during the mining process. The loss of this soil will be mitigated through the restoration of approximately 30.1 acres of wetlands in currently non-wetland areas containing hydric or formerly hydric soil in mitigation parcels on both the west (River and River South) and east (Long Run and ComEd) sides of the river. In addition, another approximately 249 acres of wetlands and uplands with hydric soil will be enhanced with approximately 117 acres on the west side of the river (River, River South, and Fitzpatrick Seep) and approximately 132 acres on the east side (Long Run and ComEd). Additional wetlands with hydric soils will be enhanced on North, Far North, and River North Parcels on the west side of the river.

- 20 2. Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets and/or sheet flow within fens:

25 Surface and groundwater studies (AES 2012a & 2013; AECOM 2009) as well as observation during site investigations (Mierzwa and Webb 2012c) indicate that Middle Parcel is dry during much of the growing season and that surficial discharge of groundwater on the parcel in the form of seeps or springs occurs very infrequently. Rivulets or streamlets of groundwater discharge are not present in Middle Parcel. Only one possible observance of a groundwater seep has been reported on Middle Parcel in the past 25 years (TAMS 1994), but channelization from the discharge (in the form of a rivulet) was not present and the seep was over 100 meters southwest of the areas where HED exuvia were found in 1993. The one seep witnessed at the Parcel was too small to form a streamlet (Mierzwa 2009). Cashatt et al. (1993) documented HED reproduction within a small area of cattail marsh, within small streamlets which may have been deer trails. Observations in 1994 and 1995 indicated that the streamlets at Middle Parcel had “slight but almost unmeasurable flow” (Mierzwa et al. 1995; Gochee 1995). No streamlets were visible upgradient on the site, including on a scraped area of exposed bedrock at the western edge and just inside the berm. After significant rainfall events, surface saturation in adjacent dolomite prairie was observed to recede west to east, thus precipitation falling within Middle Parcel is believed to have been transmitted as interflow through the organic substrate on top of shallow bedrock prior to discharging to the marsh where breeding activity was observed. Conditions at Middle Parcel, both in the mid-1990s and more recently, were further characterized and mapped by Mierzwa and Webb (2009). Even though the wetlands in Middle Parcel are dry for much of the growing season and rivulets are not present, groundwater levels within the Parcel have remained consistent over the period of 2005 to 2013 (Appendix G-1, Attachment 1). The maintenance of groundwater levels and similar observations over the past two decades indicate that hydrologic conditions have remained stable within the parcel during this time frame.

45 Throughout much of the Parcel (from north to south), the water table is within three to five feet of the surface and deeper potentiometric head levels are typically 0.5 to 1.5 feet above the water table elevation. This indicates that there is an upward flow of groundwater from deeper portions of bedrock that helps to maintain head levels and cool temperatures of groundwater near the ground

5 surface. Fluctuations occur seasonally throughout the parcel but are more recognizable near the face of the Quarry on the south end of the Parcel. However, deep bedrock piezometric heads are consistently higher than shallow head levels throughout the year at all other areas. Thus, groundwater occurs consistently through this parcel at shallow depths and has remained relatively stable during at least the last decade. Groundwater has not been observed to discharge at the ground surface with sufficient quantities of water to form rivulets critical for establishment of HED larvae over the past 25 years.

10 On the occasions when surface flows pool to form minor rivulets, the source of these features appears to be from heavy precipitation since sources of groundwater discharge are not present. Documentation of conditions of the parcel prior to HMS' monitoring indicates similar conditions. These reports mention a rivulet, but an assessment of the rivulet with respect to groundwater contributions or rainfall runoff was not conducted. Therefore, the presence of seeps on this parcel is extremely limited since only one seep has been confirmed in literature and is believed to be related to surface water drainage and not supersaturated calcareous water consistently discharging from the ground. Thus PCE #2 currently does not exist nor is it believed to have been present for at least the last 25 years on the parcel. No avoidance and minimization measures (AMMs) or mitigation are planned for PCE #2.

20 3. Emergent herbaceous and woody vegetation for emergence facilitation and refugia:

25 Nearly all the emergent wetlands on the Parcel are dominated by *Phragmites* (23 acres) and only 0.1 acre of cattail dominated marsh is found on the site. Some cattails are also found along the edges of the 6.01-acre wet-mesic dolomite prairie in areas where it borders the *Phragmites*-dominated marsh. In addition, woody vegetation (mostly invasive shrubs) borders much of the wetlands on the site. Thus, PCE #3 is present in no more than 1-2 acres of marsh on the parcel and an additional 21 acres of *Phragmites* and invasive woody vegetation near the historic larval habitat on the parcel. The loss of these marsh areas will be mitigated by the restoration or enhancement of 113 acres of marsh/emergent wetlands in all eight of the mitigation parcels.

30 4. Occupied burrows maintained by crayfish for refugia:

35 There is no evidence of crayfish presence on Middle Parcel; most telling is that crayfish have not been captured despite multiple years of intensive larval sampling at Middle Parcel in the late 1990s and in 2009-11 (Mierzwa and Webb 2009, 2011), while they have been captured at ComEd and North Parcels and every year of sampling at River South Parcel (Mierzwa and Webb 2013). Also, considerable effort has been spent searching for burrows with no success. For example, no crayfish burrows have been found in or near (within 30 feet of) streamlet systems in Middle Parcel during three years of larval sampling (Mierzwa and Webb 2009, 2010, and 2012c); streamlets on Middle Parcel do not appear to be heavily influenced by groundwater, although this may be a limiting factor for HED but not for crayfish. It is suspected, based on 1990s soil sampling, that the soil on much of Middle Parcel is simply too shallow to allow establishment of burrows to depths below the frostline (Mierzwa and Webb 2009, 2011). A similar pattern is seen at Long Run/ComEd where burrows are present where soil is deep and absent where it is shallow (Mierzwa and Webb 2011).

45 In summary, there is no evidence that crayfish burrows or crayfish were present even in the mid 1990s. None were observed at that time (Mierzwa and Webb 2009) nor more recently during larval sampling (Mierzwa and Webb 2009, 2010, and 2012c); thus PCE #4 is unlikely to be present on the site. No AMMs or mitigation are planned for PCE #4.

5. Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae and aquatic worms:

5 Aquatic macroinvertebrates are present on-site but may be limited due to the very limited amount of surface water during the growing season. Thus, PCE #5 is present on the parcel but likely limited to the 30 acres of wetlands on site. All wetland impacts will be avoided (i.e. 6.01-acre wet-mesic prairie transplant) or mitigated through the restoration (24 acres) or enhancement (225 acres) of wetlands on five of the wetland mitigation parcels (River, River South, Fitzpatrick Seep, Long Run, and ComEd). Wetland habitat improvements will also occur on the other HCP mitigation parcels (North, Far North, and River North).

Adult HED Habitat PCE

- 15 6. Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 ft (100 m)) of bordering shrubby and forested areas with open corridors for movement and dispersal:

20 Approximately 7 acres of native wetland communities (all wetlands, excluding *Phragmites*-dominated areas on both scraped and unscraped areas (23 acres)) are found on Middle Parcel and most are bordered by woody vegetation. However, no native upland plant communities are found on the parcel. In addition, the 7 acres of native wetland communities found on site are not near current larval habitat. The closest currently productive larval habitat to Middle Parcel is about 4,500 feet away (River South Parcel). However, adult HED habitat on the site (40.81 acres) (which includes open non-native upland communities) does provide open corridors for movement and dispersal. Thus, PCE #6 is present on the site. This loss of dispersal habitat will be mitigated for through the restoration of open dispersal habitat on approximately nine acres in North Parcel, 26 acres in Far North Parcel, 10 acres in River North Parcel, 29 acres in River Parcel, 28 acres on River South and Fitzpatrick Seep, and 80 acres in ComEd and Long Run Parcels. In addition, all these parcels as well as River South Bluff Parcel will be preserved.

30

7. Prey base of small, flying insect species (e.g. dipterans):

35 Flies and other flying insects have been observed on site; thus, PCE #7 is present. These prey insects will be lost with loss of habitat on the parcel (40.81 acres). This loss will be mitigated through the restoration of 29 acres of adult HED habitat on River Parcel and 154 acres on the other mitigation parcels.

Mitigation in Critical Habitat

ComEd and Long Run Parcels (CHU 7)

40 As part of the mitigation package, habitat on North, Far North, River North, River, River South, Fitzpatrick Seep, ComEd, and Long Run Parcels will be restored or enhanced. These mitigation efforts will not harm the PCEs on these parcels but are designed to improve most, if not all, of the PCEs. The only exception is the construction of an access road in Long Run and ComEd Parcels and other work related to the wet-mesic dolomite prairie transplant. Installation of the access road will result in 0.39 acres of permanent impacts and 0.03 acres of temporary impacts (see Restoration Plan Set, Appendix F). All other work related to the transplant takes place in degraded upland areas (i.e. buckthorn thicket growing on spoil piles) and therefore will not impact PCEs.

45

Larval Habitat PCE

HMS HCP

February 3, 2021

1. Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock):

Hydric soils are present in ComEd and Long Run Parcels. Soil survey maps identify wetland areas in the parcels as hydric silt loam and silty clay loam soils. Soil samples from wetland delineations confirm these soils. Soil was scraped and deposited in nearby piles mostly in ComEd Parcel years ago prior to HMS ownership. PCE #1 is present in the area of the permanent impact (i.e. wetland within and along a two-track access road) but is not in the area of the temporary impacts because these areas were previously scraped. Impacts will be minimized through the implementation of measures described in the Restoration Plan Set (e.g. erosion and sediment control) (Appendix F). The transplant of 6.01 acres of wet mesic dolomite prairie with native hydric soil adjacent to the impact area will mitigate for the loss of hydric soil on ComEd and Middle Parcels.

2. Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets and/or sheet flow within fens:

Discharged groundwater enters the northeast corner of ComEd Parcel through a drainage swale to the north and a culvert and seep through the train tracks. Water from the seep eventually flows into a rivulet-like feature (~400 ft in length). Groundwater may seep through the tracks in other locations of ComEd or Long Run Parcels, but no other discrete locations have been found. However, groundwater levels in the proposed transplant areas (i.e. scraped area) are typically within six inches of ground surface and are present within a foot of ground surface across much of the ComEd Parcel (STS 2009). In addition, HED larvae were found in a streamlet feature at the very north end of Long Run Parcel (but is now classified as Historic larvae habitat), indicating that appropriate groundwater hydrology is present in this location too. Therefore, PCE #2 is known to be present in at least two locations on these parcels. The closest disturbance to these features during restoration activities is over 200 feet away (i.e. installation of the access road for wet-mesic prairie transplant area). Therefore, with proper installation of avoidance measures, none of these features will be impacted by the installation of the access road. In addition, restoration on these parcels (i.e. invasive woody removal) will likely improve site hydrology.

3. Emergent herbaceous and woody vegetation for emergence facilitation and refugia:

Almost all of Long Run Parcel is wetland (175.8 of 183 ac) and over half of ComEd Parcel (61.1 of 103 ac) is wetland. Approximately 30 acres of emergent wetlands, excluding monotypic stands of *Phragmites*, are found on these two parcels, and woody vegetation (mostly invasive shrubs) borders much of the wetlands on the site. Thus, PCE #3 is present on over 30 acres of marsh and other woody areas bordering wetlands on the parcel. No marsh areas and no or little native woody vegetation will be impacted during the access road installation. Proper erosion and sediment control measures will be used to prevent any impacts to nearby emergent areas (see Restoration Plan Set, Appendix F). All wetland habitat impacts on these parcels will be mitigated for through wetland restoration and enhancement on these same parcels.

4. Occupied burrows maintained by crayfish for refugia:

Occupied crayfish burrows have been found on ComEd (Mierzwa and Webb 2012c) and Long Run (Brown and Soluk 2012) Parcels in recent years. Other likely larval habitat areas on these parcels (e.g. marsh and sedge meadow in the northeast corner of ComEd) have been searched for crayfish burrows but none have been found. Thus, PCE #4 is present in at least two locations on these

parcels, but both are at least 300 feet from the impact area. Therefore, with proper installation of avoidance measures, none of these burrows will be impacted by the installation of the access road.

- 5 5. Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae and aquatic worms:

10 Almost all of Long Run Parcel is wetland (175.8 of 183 ac) and over half of ComEd Parcel (61.1 of 103 ac) is wetland, so plenty of aquatic macroinvertebrate habitat is present on site. Thus, PCE #5 is present on these parcels. Both permanent and temporary impacts may affect habitat for
15 macroinvertebrates. Timber or composite matting will be used to provide access through some wetland areas (temporary impacts (0.03 ac)). Vegetation typically recovers within a year after removal of this matting. Habitat will be lost in the area where the permanent access road is installed (0.39 ac). Proper erosion and sediment control measures will be used to prevent impacts to adjacent wetland areas (see Restoration Plan Set, Appendix F). Restoration of 25.1 acres of wetland on these two parcels will mitigate for the very small loss of aquatic macroinvertebrate habitat.

Adult HED Habitat PCE

- 20 6. Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 ft (100 m)) of bordering shrubby and forested areas with open corridors for movement and dispersal:

25 Approximately 52 acres of native communities (i.e. mesic dolomite prairie, wet-mesic dolomite prairie, wet prairie, sedge meadow, cattail marsh, and other native emergent vegetation) are found on ComEd and Long Run Parcels. One larval habitat area (north end of Long Run) has been confirmed on these parcels (but is now classified as Historic larvae habitat). Some of these native communities are found near (within 100 m) the larval habitat while others are located further away but provide corridors for movement and dispersal. Thus, PCE #6 is present on the site. All of the areas impacted by the access road are located more than 100 meters away. This loss of dispersal
30 habitat will be mitigated for through habitat restoration and enhancement on these same parcels.

7. Prey base of small, flying insect species (e.g. dipterans)

35 Flies and other flying insects have been observed on site. In addition, foraging adult HED have been observed on these parcels indicating the presence of appropriate food items (Mierzwa and Webb 2009 and 2012b). Thus, PCE #7 is present. The permanent loss of 0.39 acres of habitat will have very little, if any, impact on the flying insect population in these parcels. Any loss that may be experienced will be mitigated for through habitat restoration and enhancement on these same
40 parcels.

Other parcels within CHU 2 that could be affected by mining or other development activities:
45 Parcels adjacent to and near Middle Parcel are also within CHU 2. These include River, North, Far North, and River North Parcels. None of these parcels contain larval habitat, and all have only two of five larval habitat PCEs (3 and 5) with the exception of North Parcel, which also contains occupied crayfish burrow (PCE 4). Although they all contain wetlands with hydric soils, none have organic soils (i.e. histosols) (PCE 1) according the Will County Soil Survey (Struben 2012). All four of these parcels contain both adult HED habitat PCEs (5 and 6). Although none of the natural wetland communities on any of these five parcels are near breeding/larval habitat (>3,000 feet),

some of the wetlands on each parcel do provide open corridors for adult HED movement and dispersal.

5 The small setback strip (350 ft back from Route 53) along the west side of North (6.5 ac) and Far North Parcels (10.7 ac) may be developed during the permit period. These areas contain old field and buckthorn thickets on fill and provide 1.1 and 7.3 acres of adult HED habitat, respectively, and no larval habitat. No larval PCEs are present in either of these areas. Adult HED PCE #7 is likely present in both areas, but PCE #6 may only occur in the North Parcel setback area. The North Parcel setback area is within 300 meters of documented HED adult wetland habitat. However, no adult HED use has been documented on Far North Parcel, and it is located further away than North Parcel from the nearest known larval habitat.

15 The inundation of Pierce Eich Quarry will reduce the potential groundwater impacts on neighboring parcels from mining Middle Parcel. Surface mining in Middle Parcel will likely only affect groundwater levels in the adjacent North Parcel and possibly the Midwest Generation easement parcel (immediately east of North Parcel) based on long-term simulations in the groundwater model. Other nearby areas will not experience significant changes in hydrology since declines in groundwater levels are predicted to be minimal and limited to the southern-most portion of the Far North Parcel. Furthermore, the HED habitat on these parcels, including the PCEs, will likely remain in current conditions, since the wetlands on these parcels are highly influenced by surface water (AECOM 2014b). This is also true for River Parcel because nearly all of its wetlands are found along the river and its backwaters (Figure 6.1, Appendix A). Almost all of the northwest portion of River Parcel is upland and is dominated by non-native old field vegetation. In addition, any impacts to the PCEs on the North, Far North, and River Parcels will be mitigated through the habitat restoration on these parcels (9, 27, and 29 acres on each parcel, respectively).

Other CHUs and other parcels with larval habitat in the Planning Area:

Lockport Prairie Nature Preserve (CHU 1)

River South Parcel (CHU 2)

30 *Romeoville Prairie Nature Preserve (CHU 3)*

Long Run Seep Nature Preserve (CHU 7)

Lockport Prairie and River South are both located in Critical Habitat (CHU 1 & 2, respectively), and all seven PCEs are present in both of these parcels. Romeoville Prairie is also in Critical Habitat (CHU 3), and all seven PCEs are likely present in this parcel as well. All three of these parcels are located on the same (west) side of the river as the proposed mining activities, and two of them (River South and Lockport Prairie) potentially could experience indirect groundwater effects from the mining. However, through the implementation of avoidance measures (i.e. infiltration galleries and an infiltration basin), none of HMS' mining activities are expected to impact these parcels or any of their PCEs. Long Run Seep Nature Preserve (CHU 7) is located on the east side of the river, and thus will also be unaffected by HMS' mining activities.

5.1.7 HED Compensatory Mitigation

45 HMS proposes the following mitigation plan to offset estimated habitat impacts and incidental take of the HED from the surface mining of Middle Parcel and other activities. HMS' mitigation involves the use of a science-based restoration and land management program that focuses on significantly contributing to the success of the HED Recovery Plan goals. Although these mitigation efforts are designed to benefit the HED, the habitat improvements will also benefit the
HMS HCP

other Covered Species (i.e. spotted and Blanding’s turtle and LPC). Elements of this program include a remedial restoration phase structured around necessary intervention to quickly improve the ecological health of the communities on which the HED and the other Covered Species depend, followed by a maintenance phase, which maintains the desirable ecological conditions. Restored and managed areas will be monitored (see Chapter 6). This will provide feedback on the effectiveness of both phases, which will facilitate adaptive management, and allow program changes and refinements to increase effectiveness. The mitigation package for the HED is designed to meet the following biological goals:

1. River South and Fitzpatrick Seep: Improve and expand current adult and larval HED habitat areas found on the River South Parcel and Fitzpatrick Seep. Both adult and larval HED habitat will be expanded through the reduction of invasive species.
2. Long Run and ComEd parcels: Restore adult and potential larval HED habitats. Adult HED habitat will be expanded through the reduction of invasive species, especially woody species. Historic and potential larval HED habitat may be restored in areas where appropriate hydrology, soil, and plant structure exist or can be developed.
3. Middle Parcel: Minimize the impacts to the highest quality habitat area by transplanting the wet-mesic dolomite prairie in Middle Parcel to areas in ComEd Parcel where topsoil has been scraped off or existing spoil piles will be removed.
4. River, North, Far North, and River North Parcels: Restore and enhance adult HED habitat by removing invasive shrubs and trees and reducing *Phragmites*. This will also include some turtle nesting habitat enhancements on River Parcel.
5. Habitat protection: All parcels with restored or enhanced habitat will be protected in perpetuity (i.e. North, Far North, River North, River, River South, Fitzpatrick Seep, ComEd and Long Run). In addition, River South Bluff Parcel will also be protected in perpetuity to help ensure protection of habitat in River South Parcel. Permanent protection will be provided through a declaration of restrictions on these parcels that will be converted to a conservation easement held by a qualified conservation organization if one can be found. (Note: All North and Far North Parcels will be preserved except for a 350-ft-wide frontage area along Rt. 53. In addition, the declaration of restrictions will allow 12 acres within the preserved parcels to be used for the installation of ventilation shafts after the permit period ends)

In total, 531 acres of property will be preserved through a declaration of restrictions, which will be established within 30 days after HMS’ receipt of all required permits and authorizations from federal, state and local agencies to proceed with the project, and prior to any “take” of the Covered Species. (If any of the permits and authorizations are invalidated by a court of competent jurisdiction such that HMS is not allowed to move forward with its project, the declaration of restrictions shall likewise be invalidated.)

The declaration of restrictions will be recorded with Will County and will later be converted to conservation easement. The conservation easement will be granted to an entity entitled to hold such easement under Illinois law (the Conservation Entity) and its terms will be enforceable under Illinois Law (the Real Property Conservation Rights Act (765 ICCS 120) and the Illinois Natural Areas Preservation Act (525 ILCS 30)) and by USFWS. The USFWS must approve the easement holder but not withhold approval unreasonably. The Declaration of Covenants, Conditions, and Restrictions is found in Appendix J.

After the declaration of restrictions is converted to a conservation easement, HMS will be allowed access to these parcels to implement all avoidance and minimization measures and as well as perform all enhancement, restoration, and maintenance activities during the permit period to reach the performance standards contained in Section 6 of the HCP. These activities will be performed by HMS throughout the 30-year permit period; upon expiration, those activities will be handled by the Conservation Grantee, who will manage the parcels in accordance with the conservation easement.

HMS will fund the restoration, enhancement, maintenance, and management during the permit period (30 years) on its own, as described in Section 7 below. Thereafter, funding for the ongoing management and maintenance of the declaration of restrictions or conservation easement Property will progress according to the terms of the declaration of restrictions or conservation easement.

Measures to achieve the above five biological goals will be implemented while being sensitive to the needs of other entities operating in the Permit Area in connection with their operational needs in adjacent ROWs and easements and minimizing additional risk of take. Additional details of this plan can be found in the Restoration Plan Set (Appendix F).

As part of its subsurface mining plans that would take place after the permit period, HMS may need to conduct underground operations on the preserved mitigation parcels which would require the construction and maintenance of access and air shafts, access roads, utility lines, staging areas, equipment and material storage, fencing, and any other improvements or facilities reasonably necessary to conduct or support underground mining. HMS agrees that the access improvements shall: (a) not exceed more than twelve (12) acres of the mitigation parcels in total; and (b) be constructed so as to have the least amount of impact to the mitigation values established in the USFWS Permit and the 404 Permit.

No access improvements shall be located within two hundred (200) feet of HED larval habitat nor within the upgradient water supply of the larval area. Nor shall they be located in an area used by Blanding's or spotted turtle for nesting. All permits required for these improvements will be obtained at the time of installation which will be years, if not decades, after the termination of the permits for this HCP.

Restoration in River South Parcel and adjacent Fitzpatrick Seep

HMS will implement a strategy that will enhance current adult and larval HED habitat and restore likely historic HED adult habitat and, where possible, expand larval habitat by restoring native plant communities and appropriate habitat structure. Vegetation will be restored through the removal and/or application of herbicide to invasive woody and herbaceous species and by re-establishing native species. Since ComEd's ROW runs between these two parcels and along the western edge of River South Parcel, HMS will coordinate this work with ComEd as needed. In addition, the groundwater supply in these parcels will also be protected from mining impacts with avoidance measures HMS will implement (i.e. infiltration galleries in River South Bluff Parcel) (see Section 5.1.3).

Reduce invasive species:

HMS will remove and/or apply herbicide to invasive plant species as necessary to restore former HED adult and larval habitat locations (e.g. where suitable hydrology may be present). These are critical locations where invasive species, such as European buckthorn and common reed, have grown over the formerly suitable wetland habitats, preventing adult HED from accessing them for foraging, ovipositing and breeding. HMS will carefully reduce or eliminate the invasive species in

these locations and restore plant communities and, if possible, hydrology suitable for the HED. Some important larval habitat areas in River South, such as Emerald Meadow, have been completely overgrown by cattails. Measures will be taken to greatly reduce cattail in these areas and restore more preferable habitat structure for the HED.

5

Restoration in ComEd and Long Run Parcels

HMS will implement restoration plans for these properties to enhance and restore habitat for the HED and other Covered Species. Restoring ComEd Parcel along with the northern portion of Long Run Parcel will expand HED habitat around and near the only known larval HED habitat areas (current and historic) on the east side of the river (i.e. within Long Run Parcel and Long Run Seep Nature Preserve). These plans will improve adult and larval HED habitat by:

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1. removing invasive woody species;
2. reducing invasive herbaceous species through herbicide applications, prescribed burning, and other means;
3. re-establishing appropriate native vegetation in areas formerly dominated by invasive species;
4. potentially re-establishing larval habitat through the implementation of items 1-3 above;
5. removing spoil piles; and
6. transplanting the wet-mesic dolomite prairie from Middle Parcel to former spoil areas and historic scraped areas.

Coordination with ComEd:

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ComEd has several easements that cross ComEd Parcel (this parcel is owned by HMS). ComEd will manage the woody vegetation within most of its easements, but HMS will coordinate with ComEd to complete other management (e.g. follow-up herbiciding or prescribed burning) within these easements to ensure consistent management across the site. In addition, HMS will review its restoration plans for the parcel with ComEd to help facilitate and coordinate mitigation efforts, minimize risk of take, and maintain proper access.

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Removing invasive woody species and re-establish native vegetation:

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HMS will restore large areas of adult HED habitat by removing invasive shrubs (e.g. buckthorn) and trees (e.g. green ash) in ComEd Parcel and the northern portion of Long Run Parcel. This will be done in conjunction with herbicide applications to non-native herbaceous vegetation (e.g. reed canary grass) and the re-establishment of appropriate native wetland species. Establishment of native wetland communities will also be facilitated through improved wetland hydrology due to the removal of woody vegetation that will result in the reduction of water loss through evapotranspiration. Restoring these native open wetland communities will also improve habitat for the covered turtle species.

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Creating larval habitat:

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Although HMS does not anticipate a need to mitigate for impacts to larval habitat, its restoration measures may nonetheless facilitate the formation of more larval habitat. Once the invasive woody vegetation is removed or reduced, soil hydrology will improve, and existing rivulets may flow and new ones may form. Improved hydrology is anticipated from the reduction in water loss through evapotranspiration. As larger areas of invasive woody vegetation are removed in these parcels, this “wetting up” phenomenon, along with invasive species control, may create larval HED habitat conditions. HMS anticipates some historic rivulets—drainage routes over these properties, will likely re-establish and may become accessible to the HED without intervention (e.g. excavation).

Invasive species removal may also restore HED access to some rivulets which historically supported breeding activity and still retain suitable hydrology, but which have become so overgrown that dragonflies are no longer able to enter them. As stated above, HMS does not anticipate needing to restore larval habitat on these parcels as part of its mitigation efforts.

5 However, if it is needed and rivulets do not re-establish after these restoration efforts, measures could be taken to create new larval habitat. This could be achieved by other hydrological restoration measures, such as installing passive controls on drainage ditches, which may help restore the hydrology of seasonally dewatered areas. In addition, rivulets could be constructed by hand, in areas with appropriate hydrology, using low impact techniques developed in the Interstate-355 project.

Spoil pile removal and wet dolomite prairie transplant:

Restoration on ComEd Parcel will involve spoil pile removal and the restoration of these spoil removal areas and older scraped areas with transplanted wet-mesic dolomite prairie. Historic excavation of soils in ComEd Parcel has left large areas of exposed bedrock. Spoils were piled in adjacent areas as well as other locations in the parcel. HMS will transplant the salvaged native soils and vegetation from the wet-mesic dolomite prairie in Middle Parcel to the scraped and former spoil pile areas. This will restore these areas to productive adult foraging HED habitat (as well as Blanding's turtle habitat).

20 During the transplant, topsoil with vegetation salvaged from HMS' Middle Parcel will be removed and delivered to the scraped and spoil removal areas using access routes along previous haul roads (see Restoration Plan Set; Appendix F). Spoil piles will be removed before and/or during the transplant process to reveal the bedrock beneath. These spoil areas currently have dense thickets of common buckthorn, and results of the test plots on these spoil piles have demonstrated that they contain almost no native seed bank.

30 Because the site hydrology has been altered from soil removal and the presence of a seasonally hot exposed bedrock surface, re-soiling also will reduce evaporative water loss, allowing the restoration of wetland hydrology in this scraped area. It is anticipated that the hydrology in this area will support the transplanted wet-mesic prairie because groundwater investigations have already documented it to be suitable for maintaining root zone moisture. Groundwater levels in the scraped area are typically within six inches of ground surface and are present within a foot of ground surface across much of the ComEd Parcel (STS 2009). Only areas closer to the regional sink on the west side of the Parcel, the Chicago Sanitary and Ship Canal (and I&M Canal), have slightly deeper groundwater levels. In fact, throughout the eastern and central portions of the Parcel, deeper bedrock piezometric heads indicate groundwater elevation at or above ground surface. These strong upward gradients indicate that cool groundwater supplies will be consistently near (i.e. slightly above or below) ground surface. In addition, the same plant community currently grows in and around the margins of the bedrock scrape and spoil areas, which are at the same topographic elevations with similar surface hydrology as the dolomitic wet-mesic prairie's original location in Middle Parcel.

Improve connection with Long Run Seep Natural Preserve:

45 Long Run Seep Nature Preserve, owned by the Illinois Department of Natural Resources (IDNR), is directly east, across New Avenue and the railroad tracks, from the HMS Long Run Parcel. HMS will improve the connectivity between habitats in the two parcels. Currently, dense invasive woody vegetation found within the HMS property obstructs the connection of suitable HED habitat between these properties. Restoration on HMS' parcels will improve the connections between the

habitat areas in these properties by removing and reducing the invasive woody vegetation and by re-establishing native vegetation in ComEd Parcel and the northern portion of Long Run Parcel.
Benefits of HMS Ecological Restoration and Mitigation

5 The existing ecological conditions on the HMS properties that will be restored as part of this HCP are displayed in the existing conditions sheets in the Restoration Plan Set in Appendix F. The proposed restored conditions (Restoration Zone sheets in the Restoration Plan Set) of these same parcels show a major shift from large areas dominated by invasive woody vegetation to wet prairie and sedge meadow communities. Table 7 below documents the existing and proposed vegetation types and their acreages that will result from the restoration of HMS parcels included in this HCP.
 10 The primary habitat types to benefit are the most important habitats for the HED, the turtles, and leafy prairie clover (LPC). These habitat types—wet prairie, sedge meadows, and emergent wetlands, are the primary habitats identified in the HED Recovery Plan to restore and assist in the recovery of the HED. Conversely, there will be a dramatic reduction in areas dominated by weedy trees and shrubs. The turtles and LPC will also benefit from the HED restoration efforts in these
 15 same properties.

Table 7. Existing and proposed restored habitat types in HMS properties (River South, Fitzpatrick Seep, River, North, Far North, River North, ComEd, and Long Run Parcels).

Land Cover Habitat Type	Existing Acres	% Cover	Proposed Acres	% Cover	Change in % Cover
Old Field/Grassland	23.25	6.4%	48.74	13.5%	7.1%
Woodland Upland	11.37	3.1%	1.63	0.5%	-2.7%
Woodland Bottomland	27.44	7.6%	0	0.0%	-7.6%
Savanna	0	0.0%	5.99	1.7%	1.7%
Wet/Wet-Mesic Savanna	0	0.0%	26.15	7.2%	7.2%
Shrubland Upland	74.95	20.8%	2.13	0.6%	-20.2%
Shrubland Bottomland	40.3	11.2%	0	0.0%	-11.2%
Dry/Mesic Prairie	0.9	0.2%	0.67	0.2%	-0.1%
Wet-Mesic/Wet Prairie	13.34	3.7%	77.46	21.5%	17.8%
Wet Prairie/Sedge Meadow	9.66	2.7%	68.13	18.9%	16.2%
Wet Meadow - Reed Canary	44.26	12.3%	13.95	3.9%	-8.4%
Marsh - Cattail/Emergent	78.1	21.6%	113.28	31.4%	9.8%
Marsh - Phragmites	34.63	9.6%	1.34	0.4%	-9.2%
Scraped	1.64	0.5%	0	0.0%	-0.5%
Fill-Other Material	1.32	0.4%	1.32	0.4%	0.0%
Total	361.16	100.0%	360.79	100.0%	

20 *All areas within parcels that will have some restoration occur on them are included. Therefore, not all areas included will be restored and the total acreage is larger than the total to be restored and enhanced (281 acres).

**Old Field/Grassland includes Old Field/ Upland Grassland and Old Field/Wet existing landcovers. Dry/Mesic Prairie includes Dry Dolomite Prairie, Dry-Mesic Dolomite Prairie and Mesic Dolomite Prairie existing landcover. Wet-Mesic/Wet Prairie includes Wet-Mesic Dolomite Prairie existing landcover and both Mesic/Wet-Mesic Prairie and Wet/Wet-Mesic Prairie restoration zones. Marsh – Cattail/Emergent includes Marsh-Bulrush Sweetflag existing landcover and Emergent restoration zone.

25 ***See Table C-8 in Appendix C for existing and proposed restored habitat types in each mitigation parcel.

Table 8 below is a summary of the habitat benefits of HMS mitigation plans. The nine parcels permanently protected under this HCP (River South, Fitzpatrick Seep, River South Bluff, River, North, Far North, River North, ComEd, and Long Run Parcels) encompass 531 acres and currently contain 229 acres of adult HED habitat, a quarter acre of larval habitat, and 406 acres of potential Blanding’s and spotted turtle habitat. Preservation of these parcels will protect 17.9% of all HED Critical Habitat in Illinois. In addition, approximately 139 acres of HED and covered turtle habitat will be enhanced, 182 acres will be restored, and 32 acres will be maintained on these parcels. All areas where habitat structure was significantly changed (i.e. brushing or thinning of weedy woody vegetation and removal of *Phragmites*) are considered “restored,” all other areas that were improved in other ways (e.g. herbiciding and/or seeding) are considered “enhanced,” and areas that are managed solely with fire are considered “maintained.” Acres of habitat restoration and enhancement along with maintained acres in each mitigation parcel are listed in Table 9. As a result of the habitat restoration in this plan, known adult HED habitat in Illinois will increase by 11.9%. A more detailed summary of HMS’ mitigation plan and its benefits is found in Table C-9 in Appendix C. Restoration on these parcels will also result in the creation of approximately 80 acres of potential Blanding’s and spotted turtle habitat by converting over half of the low potential turtle habitat (141 acres) to medium or high potential habitat (Table C-10).

The biological goal of restoring covered species potential habitat and enhancing existing habitat will be achieved when the performance standards for habitat restoration and enhancement (see Chapter 6) are met in mitigation areas equaling the acreages listed in Table 8. The biological goal of Covered Species habitat protection will be achieved when the number of acres listed in Table 8 is protected through establishment of a declaration of restrictions on the parcels listed above. Of the 530.9 acres preserved through the declaration of restrictions, 12 acres will be allowed to be developed after the permit period ends for the installation of ventilations shafts for subsurface mining. As a result, 518.9 acres will be permanently protected.

Table 8. HMS mitigation benefits: the HED and covered turtle habitat areas protected, maintained, enhanced, and restored.

Habitat	Acres Protected
HED larval/adult	0.26ac (1,979 ln ft) / 229 ac (known habitat)*
Blanding’s turtle	406 ac (potential habitat)**
Spotted turtle	406 ac (potential habitat)**
Total property preserved (permanently protected)	531 ac (519 ac)
Habitat	Acres Maintained, Enhanced or Restored
HED habitat maintained	32.5 ac
HED habitat enhanced	139.2 ac
HED habitat restored	182.2 ac
Blanding’s and spotted Turtle habitat maintained	32.5 ac
Blanding’s and spotted Turtle habitat enhanced	139.2 ac
Blanding’s and spotted Turtle habitat restored	182.2 ac

*See Appendix B for breakdown by parcel.

** Based on potential habitat rankings of High and Medium (see Figures 12 & 13). Acres of protected potential turtle habitat in each mitigation parcel are listed in Table C-10 in Appendix C. In addition, approximately 80 acres of Low

potential habitat will be converted to High or Medium through habitat restoration, bringing the total protected to approximately 486 acres.

Table 9. Acres of habitat restoration, enhancement, and maintenance on each mitigation parcel

Mitigation Parcel	Parcel Size (acres)	Acres Restored	Acres Enhanced	Acres Maintained
ComEd / Long Run	285.5	79.8	77.6	0.0
River South & Fitzpatrick Seep	71.2	27.7	38.5	0.0
River Parcel	61.0	28.6	23.1	4.7
North Parcel	31.4	9.4	0.0	12.5
Far North Parcel	50.4	26.5	0.0	12.1
River North Parcel	24.8	10.2	0.0	3.2
Total		182.2	139.2	32.5

5 HMS will, over the 30-year permit period, restore, enhance, maintain, and manage 354 acres of habitat for the HED and the covered turtle species in the quantities and on the parcels listed in Table 9 and described above. These habitat improvements and preservation of 531 acres (and permanent protection of 519 acres) that includes all these areas and adjacent habitat and potential habitat area will more than offset the impacts of “take” of the HED and the other covered species and will, therefore, to the maximum extent practicable, minimize and mitigate such impacts (ESA section 10(a)(2)(B)ii).

5.1.8 Mitigation of the Impact of Take

15 Below is an explanation of how HMS’ above mitigation plan will directly off-set its anticipated impact of take (see Section 5.1.5).

Mitigation at the population level

20 All impacts to individual HED, the HED habitat, and to the HED populations will be off-set by measures in HMS’ mitigation package included in this HCP. Lost/displaced adult HED individuals in Middle Parcel are anticipated to be replaced by an increase in adult HED numbers in North and River Parcels (immediately adjacent to Middle Parcel) and Far North and River North Parcels (~1600 ft north of Middle Parcel) and River South Parcel (~3500 ft south of Middle Parcel) as a result of habitat restoration and enhancement measures. These measures will improve and expand adult HED habitat in all these parcels. In addition, all these parcels will be permanently protected, thereby preserving the dispersal corridor between RPNP and LPNP. Restoration and enhancement measures in Long Run and ComEd Parcels also will add approximately 157 acres of adult HED habitat (restored and enhanced, including opening up of dense shrub cover which currently precludes HED flight) on the east side of the river. The restoration in Long Run and ComEd Parcels will increase and strengthen the adult HED population on the east side of the river, and also contribute to the population on the west side of the river as a result of a net gain in foraging habitat close to existing breeding sites, with a possible net gain in breeding habitat.

35 Impacts to connectivity due to the loss of habitat in Middle Parcel will be mitigated by the adult HED habitat enhancements on North and River Parcels (immediately adjacent to Middle Parcel) and Far North and River North Parcels located between Middle Parcel and RPNP. Frequent adult HED use of River, North, and River North Parcels was documented in recent years (Mierzwa and Webb 2012a, 2012d, 2014 and 2016, and Mierzwa 2013). Evidence of movement between

Romeoville Prairie and River North was documented in 2016, along with observations of probable breeding and dispersal at Romeoville Prairie (Mierzwa and Webb 2016). In addition, loss of connectivity will be further mitigated by the restoration and enhancement of 157 acres in ComEd and Long Run Parcels directly across the river (east) from Middle, North, Far North, and River North Parcels. HED have been documented flying above the river at the extreme southern end of River South Parcel (Vogt and Cashatt 1999), and there is evidence that they cross the river in considerable numbers between Lockport Prairie and Dellwood Park West (Mierzwa et al. 2010) as well as travel long distances (north and south) along the river valley. Evidence of long-distance dispersal was documented by Mierzwa (editor, 1995) when they recorded that four (2.2%) of the 183 dragonflies marked on Lockport Prairie, River South, and Middle Parcel were later observed at sites other than the one they were marked on; with dispersal distances ranging from 3.3 to 5.4 km.

It is anticipated that more adult HED from various locations throughout the river valley will be utilizing ComEd and Long Run Parcels once they are restored. It is also expected that restored areas at River, North, Far North, and River North Parcels will see increased use by HED originating from River South and RPNP, and this will contribute to connecting the southern sites (Lockport Prairie and River South) with sites to the north (RPNP and others) and possibly with those on the east side of the river. This will result in maintaining north-south connectivity within Sub-population 1 and the entire river valley (Figure 18, Appendix A). The restoration and enhancement of ComEd and the northern portion of Long Run Parcels is expected to result in a net gain of habitat for females foraging away from breeding sites and for males dispersing between sites or foraging. In addition, based on the recent discovery of larval habitat in Long Run Parcel (Brown and Soluk 2012) (now considered lost/historic habitat by USFWS), more larval habitat also may be created as a result of restoration in these parcels.

In summary, HMS will impact 49.6 acres of approximately 1,526 acres of known HED habitat within the lower Des Plaines River Valley area (and only 3.3% within CHUs). The loss of habitat in this location will result in narrowing the area of connectivity between adult HED habitat sites on the west side of the river because the habitat on Middle Parcel and the western portions of North and Far North Parcels will be removed. These impacts are relatively minor given that a north-south corridor will remain intact via River Parcel, North Parcel, River North Parcel, and the ComEd ROW. The vast majority of adult HED habitat and individuals will be unharmed by the activities on Middle and other parcels. In addition, the impacts to adult HED habitat and connectivity will be mitigated for by the preservation or restoration (i.e. removal of weedy woody vegetation and *Phragmites*) of all adjacent and nearby parcels owned by HMS. These parcels currently provide foraging habitat and a movement corridor and will provide even more after restoration on River, North, Far North, and River North Parcels. Preservation and opening up of this corridor through weedy woody vegetation and *Phragmites* removal will maintain connectivity between habitat areas north and south of Middle Parcel and may increase movement to and from Romeoville Prairie. Restoration and enhancement of Long Run and ComEd Parcels will also help improve connectivity between habitat locations within the river valley and expand habitat to HED originating from Long Run Seep Nature Preserve.

In addition to mitigation measures to off-set direct habitat impacts from mining, HMS will implement a number of avoidance measures to prevent potential groundwater-related impacts to known larval habitat areas (see Section 5.1.3). As a result, the core breeding populations in the state (River South and Lockport Prairie) will be protected.

Therefore, there will be very limited adverse effects to the overall health and viability of the HED populations within the HCP Planning Area and the lower Des Plaines River Valley resulting from surface mining of Middle Parcel and continued mining of existing mines. Moreover, even these limited impacts will be more than offset by HMS' mitigation measures included in this HCP:

5 restoration or enhancement of 321 acres of habitat on 519 acres of permanently protected land (within 531 acres preserved under a declaration of restrictions). This will result in increasing adult HED habitat in the Lower Des Plaines River Valley by over 12% and preserve nearly 18% of all Critical Habitat in Illinois.

10 *Mitigation at the genetic level*

The HED population in the lower Des Plaines River Valley will be impacted by HMS' surface mining operations through the loss of adult HED habitat in Middle Parcel and a reduction in connectivity between remaining habitat locations. This could result in reduced dispersal and gene flow between breeding sites to the south (e.g. River South) and other habitat areas to the north (e.g. RPNP). Loss of adult HED habitat on the western portion of North and Far North Parcels, however, is not expected to have an impact on the HED population because of its poor quality and peripheral location. As stated above, habitat improvements on River, North, Far North, and River North Parcels will maintain a movement/dispersal corridor and preserve connectivity between these sites on the west side of the river. In addition, restoring ComEd Parcel and the north portion of Long Run Parcel will contribute to improved connectivity between the only two current and former breeding habitat sites on the east side of the river (i.e. ComEd/Long Run and Long Run Seep Nature Preserve) while encouraging movement across the river between Long Run and ComEd parcels and River and River South parcels and Romeoville Prairie (Exhibit 18; Appendix A). Also, habitat restoration and enhancement on the east side will create more useable habitat and lead to a larger population on the east side of the river. This, too, should encourage increased cross-river dispersal and improve connectivity in the river valley which will contribute to gene flow (even with potential increased predation) within Subpopulation 1 and the rest of the Illinois population to help maintain its genetic diversity and fitness.

30 **5.2 Blanding's and Spotted Turtles**

The Blanding's turtle was listed in Illinois as a state threatened species in 1999 (Dreslik and Philips 2006) and was changed to state endangered in 2009 (IESPB 2009). The greatest threats to the species are loss and fragmentation of both wetland and nesting habitat, predation, collecting, and automobile strikes (WDNR 2006 & Congdon et al. 2008). In addition, Blanding's turtle was petitioned in 2012 for federal listing (CBD 2014). The 90-day "substantial" finding was published by the USFWS on July 1, 2015, indicating that listing may be warranted for the Blanding's turtle (after further review). Its habitat includes the clean waters of marshes, ephemeral wetlands, vegetated ponds, wet prairies, sedge meadows, oxbows, fens, and slow-moving waters in sloughs and rivers. Adjacent uplands containing open grasslands or old fields in sandy soils are commonly used as nesting habitat. This turtle winters most often underwater, partially buried in soft substrate. The Blanding's turtle has been found recently in a number of parcels throughout the Permit Area including Lockport Prairie, Romeoville Prairie, HMS' Middle, North, Far North, and River North Parcels and the adjacent ComEd ROWs, and HMS' Long Run and ComEd Parcels (Figure 10).

45 The spotted turtle is a state endangered species and also was petitioned in 2012 for federal listing (CBD 2014). The 90-day "substantial" finding was published by the USFWS on July 1, 2015, indicating that listing may be warranted for the spotted turtle (after further review). The greatest threats to the species are habitat loss and fragmentation due to invasive plant species, changes in

hydrology, urban development, and collection for the pet trade industry. Spotted turtles inhabit shallow vegetated wetlands with a soft substrate, including shallow marshes, sedge meadows, cattail marshes, and wet dolomite prairies. Females nest in open, sunny locations with moist well-drained soils in sedge meadows and wet prairies. They winter in muskrat or other small mammal burrows or in shallow water in the soft organic substrate. Within the Permit Area, the spotted turtle is known to occur in Lockport Prairie and Romeoville Prairie (Figure 11).

5.2.1 Activities and Impact Analysis

As described in Section 5.1.1, HMS proposes to continue surface mining its two currently active quarries (Pierce Eich and Middle Quarries) in its Romeoville facility, expand surface mining into Middle Parcel, expand surface mining of the East Quarry north into East Parcel, and perform sub-surface mining of Galena-Platteville limestone underlying its facility. Surface mining in East Parcel and sub-surface mining will not impact turtles or their habitat. All surface mining is anticipated to be completed over a period of about 35 years, and surface mining requiring a permit will be completed in 30 years. Subsurface mining will start approximately 15 years after the ITP is issued and prior to the completion of surface mining. Associated mining activities (e.g. crushing, conveying, screening, and stockpiling) will also occur during the permit term. These plans are explained in detail in HMS' Mining Plan found in Appendix E and summarized in Section 3.2. HMS may also develop the setback areas at the west end of North and Far North Parcels.

Middle Parcel contains about 29.14 acres of potential spotted and Blanding's' turtle habitat (Figures 12 & 13). These potential habitat areas contain most of the wetlands on site. The remainder of the site is fill deposits, scraped areas, buckthorn thickets, and young woodlands. The setback areas at the west end of North and Far North Parcels contain no mapped potential turtle habitat.

Since HMS is mining almost all of Middle Parcel, it is estimated to impact all of the potential Blanding's turtle habitat (29.14 acres) and all of the potential spotted turtle habitat (29.14 acres) on the parcel. Little direct take (mortality) of either covered turtle species is anticipated to occur during mining operations in Middle Parcel because a number of avoidance and minimization measures will be implemented before and during mining operations to prevent the take of the turtle species. However, a few turtles may remain on the parcel after the exclusion fence is installed, and there is a possibility that some of these turtles, especially burrowed or inactive ones, could be overlooked during monitoring, resulting in a direct impact. A secondary and indirect effect may be the displacement of turtles utilizing Middle Parcel.

No direct take (mortality) of either covered turtle species is anticipated to occur during the development or use of the setback areas on North and Far North Parcels because they are in low quality areas and the same avoidance and minimization measures will be implemented, as needed, in these areas to prevent the take of the turtle species. It is possible that turtle habitat on these two parcels, as well as River Parcel, could be impacted because of a drawdown in groundwater from mining Middle Parcel. Current vegetation and habitat, however, is expected to be maintained because wetlands on these three parcels are heavily influenced by surface water (see Section 5.1.6).

Blanding's turtle is also found in ComEd Parcel, and the same measures will also be used during the construction of a permanent access route and wet prairie transplant activities in Long Run and ComEd parcels to avoid take. The avoidance and minimization measures are described in greater detail later in this chapter (Section 5.2.3 and 5.2.5) and the Restoration Plan Set (Appendix F). However, 0.39 acres of potential Blanding's turtle habitat will be impacted during the installation of

the access road on the southern boundary of ComEd Parcel bringing the total potential Blanding's turtle habitat loss to 29.53 acres. Although it will implement a number of AMMs to minimize take from any of its Covered Activities, as a precaution, HMS is conservatively requesting take of 12 Blanding's and two spotted turtles to cover all its activities under the HCP.

5 In addition, surface mining of the Pierce Eich Quarry, located west of Route 53 and included in the Permit Area (Figure 2, Appendix A), will continue to be mined to its permitted (IDNR permit #143-98) limits (35 ac remaining of 206 ac total). This parcel does not contain turtle habitat (Figure 10-13, Appendix A) but is located in the estimated groundwater recharge zone buffer for River South Parcel and the estimated two-mile recharge buffer for both River South Parcel and LPNP (Figure 4, Appendix A) (GAS 2004b and 2005b) both of which contain turtle habitat. Avoidance measures will be implemented to prevent potential groundwater impacts to River South and LPNP from mining the remainder of Pierce Eich Quarry.

15 Neither Middle Quarry nor East Parcel contain turtle habitat. Thus, no direct take is anticipated during the mining of these parcels. East Parcel is separated from all potential turtle habitat areas by the Des Plaines River or two canals. Thus, no potential impacts to the groundwater hydrology in habitat areas are expected from continued mining (36 ac) in this area. Only one acre will be mined in Middle Quarry, and no potential groundwater impacts to nearby turtle habitat (e.g. River South) are expected from this activity.

5.2.2 Turtle Biological Goals and Objectives

25 Neither the Blanding's nor the spotted turtle are currently federally listed, and thus a federal Recovery Plan has not been written for either. Both turtles are state-listed, but it is HMS' understanding that state Recovery Plans have not been developed for either species. The AMMs and mitigation measures that are part of this HCP, however, do address many of the goals and objectives found in other turtle recovery plans (e.g. Hays et al. 1999).

30 5.2.3 Turtle Measures to Avoid and Minimize Impacts

Prior to any construction operations (i.e. activities that involve heavy equipment, such as truck or front-end loaders) during mining, other development, or restoration, measures will be taken to avoid taking or harming either covered turtle species. These avoidance and minimization measures are listed below.

- 40 1. Maintain and repair existing fencing on the west and north sides and add fencing to the east side of the Middle Parcel to reduce the likelihood of turtle entry. Fencing should be flush with the ground (or extended 6" into the ground where possible) to reduce burrowing (or Jersey barriers may be used in some locations). One-way flaps will be installed at the bottom of the fence in selected locations to allow turtles within the parcel to leave but not re-enter. These fence improvements should be done at least one season before mining operations begin to prevent entry of turtles into the parcel from the north. Work will be performed during turtle dormant season (Nov. 1 to March 15). Fence should be inspected monthly during the turtles' active season.
- 45 2. Tree and brush removal (for both mining and restoration) will be conducted, to the extent possible, during turtle dormant season (Nov. 1 to March 15) to avoid take.

3. Overburden (i.e. soil and herbaceous vegetation) and other earth moving activities, also will be conducted, to the extent possible, during the turtle dormant season (Nov.1 to March 15).
4. To protect turtles during earth moving activities (i.e. overburden removal and prairie transplant activities) occurring during their active season, silt fence will be installed around the construction area prior to tree and shrub and overburden removal to prevent entry by turtles. Embed silt fence four to six inches into the ground to reduce burrowing. All construction areas - both in wetland and uplands, should be included. In Middle Parcel, overburden removal, and thus silt fence installation, may be done in phases. Silt fence around active earth moving areas should be inspected daily during the turtles' active season.
5. Trap and remove turtles in construction areas prior to starting activities which could cause harm or mortality. Thus, trapping will be done in each phase area identified and fenced-off and will be completed in the spring (or fall) prior to starting mining preparation activities in that area. Traps will be used and inspected according to the accepted turtle trapping protocol.
6. If earth moving activities (during mining or restoration activities) are conducted during the turtles' active period (March 16 to October 31), construction areas (where heavy equipment will be used, and surrounded by silt fence) will be searched each day before starting work. Turtles will be relocated, if found. Protocol for handling and relocating turtles will need to be developed with the IDNR. A permit is required to handle state-listed turtles. A biologist, permitted to handle state-listed turtles, will be present on-site during activities using heavy equipment during the turtle's active period.
7. Relocate turtles from mine expansion area to nearby protected habitat areas (e.g. HMS or FPDWC property). For restoration areas, possibly move to temporary off-site holding areas until activities are completed or move to on-site appropriate habitat a sufficient distance away with little to no restoration activities. If translocated turtles appear unhealthy in any way to the trained and permitted ecologist(s) performing the translocation, they will undergo a health screening for known turtle diseases.
8. No inspections or trapping will take place in areas that have already been cleared of vegetation and soil. The only exception would be areas adjacent to currently vegetated areas that may be used for vehicle traffic during stripping.
9. All blasting will take place in areas already cleared of vegetation and soil. At least 150 feet of bedrock will be exposed between the active mining area and vegetation to be removed. This does not apply to setback areas or other areas that will not be mined.
10. In mining and prairie transplant areas, install silt fences, straw rolls (i.e. wattles), or other erosion control measures to prevent sedimentation into wetland and prairie habitat.
11. In prairie transplant area, keep all vehicles (e.g. trucks, skid steers, and other heavy equipment) within fenced construction area. In other restoration areas use vehicles during frozen or dry conditions and use low-pressure tires or tracks.
12. Properly maintain vehicles, check for leaks at the start of each workday, repair leaks if needed before using vehicle on site. Carry absorbent materials with equipment or have them accessible at the site to contain spills if they occur.

13. Conduct environmental awareness training for all contractors and train restoration crew to identify Blanding's and spotted turtles. Crews should avoid spraying them and other turtles with herbicide and hitting them with a vehicle.

14. Access wetland areas with water levels deeper than 12 inches using amphibious vehicles – but access would be limited to the turtles' dormant period (November 1 - March 14).

15. Cross wetlands (with less than 12 inches of standing water) without HED breeding habitat with low ground pressure vehicles (five pounds per square inch).

16. Minimize use of road salts in areas immediately adjacent to turtle habitat.

17. Stage vehicles and heavy equipment in upland areas outside of rapid recharge areas.

18. Prescribed burning within wetlands will typically be implemented between November 1 and March 14 in order to avoid impacts to Blanding's and spotted turtle. However, weather needs to be considered to understand the species' overwintering periods in a particular year. Therefore, to maximize management opportunities while minimizing risks from fire, managers will also use the following prescription criteria to provide flexibility to the above dates when the mean 5-day temperature is below 50 °F: 1) peak daily high temperature is less than 50 °F and cloudy to mostly cloudy weather or, 2) if sunny, then only when peak daily high temperature is less than 45 °F.

The goal of protecting covered turtles and covered turtle habitat by preventing impacts during operations and restoration will be achieved when the above protection and avoidance measures are implemented successfully and confirmed through monitoring as described above and in Chapter 6.

5.2.4 Turtle Calculation of Incidental Take

Blanding's Turtle

Presence of Blanding's turtle on Middle Parcel was recently confirmed by Illinois Natural History Survey (INHS) when they found six juveniles on the property in May and June 2015 (Feng and Dreslik 2015). Prior to this, presence was inferred based on three adult turtles observed crossing the access road north of Middle Parcel - one in the late 1990s, one in June 2011, and one in June 2013 (Mierzwa, unpublished field notes). Two of the three turtles would have entered the elevated (from fill material) and wooded north end of Middle Parcel if they continued in the same direction as originally observed and were able to find a way under the chain link fence (the turtle observed in 2013 was entering North Parcel). Additional Blanding's turtles were observed well southeast of Middle Parcel in the late 1990s, one adult on the gravel edge east of the railroad tracks near the extreme northern end of River South Parcel within 20 meters of the Des Plaines River, and one juvenile near the large pond on River South Parcel in 1995 (Mierzwa, unpublished field notes).

More detailed information on Blanding's turtles is available from sites north and south of Middle Parcel. INHS conducted Blanding's turtle studies at the 108-acre Romeoville Prairie Nature Preserve (Banning and Dreslik 2010). During this study some turtles crossed 135th Street, and five (three adult females, one juvenile, and one hatchling) were encountered on or near Hanson Material Service property from 2008 to 2010. All of these observations were on Far North or River North Parcels or adjacent ComEd right-of-way, and most were associated with a small marsh complex or

a channel near the Des Plaines River. Another young (1-year-old) Blanding's turtle was found in this area by INHS in May 2015. An additional gravid female Blanding's turtle was found dead on Rt. 53 near the southwest corner of the Far North Parcel in 2008 (Banning and Dreslik 2010), and GHD found the weathered remains of a long dead adult female Blanding's turtle near the north end of the River North Parcel in June 2015 (Mierzwa and Webb 2016). Banning and Dreslik (2010) summed up their findings as follows:

“Our data indicates that turtles may either reside year-round at MSP (Material Service property) or for only a portion of the activity season (e.g. nesting). A gravid female temporarily moved south from Romeoville Prairie to MSP via the Des Plaines River to nest. Blanding's turtles are capable of moving several kilometers and could possibly travel north from Lockport Prairie nature preserve to MSP as well. Additional monitoring (e.g. trapping, visual searches, radio telemetry) would be necessary to accurately determine the number of individuals found on site.”

Feng and Dreslik (2015) captured six juvenile Blanding's turtles at Middle Parcel in 2015. All were in ditches between the marsh and fill material to the east, and in another ditch at the eastern edge of the fill material and just west of a quarry road and the rail line. They noted “pipes” (culverts installed as part of rail upgrades more than 10 years ago) and suggested that adults move into Middle Parcel from the river via these culverts. Feng and Dreslik (2015) noted that “the vegetation (*Phragmites*) seems to prevent adults from persisting, and all of the captures on this parcel were juveniles.” These findings indicate that some breeding may occur on site. Given the saturated shallow soils in the wetland portion of Middle Parcel, the most suitable nesting sites are probably on the considerably higher, better drained, open, and sunlit fill material at the eastern edge.

Earlier studies (Banning et al. 2006) evaluated the Blanding's turtle population, at the 254-acre Lockport Prairie Nature Preserve. Combining 2004 and 2005 study results, the Blanding's turtle population at Lockport Prairie was estimated at 42 individuals. Actual captures included 17 adult, four immature, and 12 juvenile animals.

Most of the sites with confirmed multiple observations include areas of known or probable core habitat, including interspersed open water, marsh, and sedge meadow (Romeoville Prairie, Lockport Prairie, Far North Parcel, and River South Parcel). Middle Parcel differs from these other sites in that the parcel does not include any permanent or semi-permanent open water habitat. Most of the vegetated marsh is currently dominated by common reed with little structural diversity (although in the mid-1990s most of this marsh was cattail dominated). Other parts of the site retain native plant communities including wet-mesic dolomite prairie; however, these communities provide only dispersal or foraging habitat. The better-quality parts of Middle Parcel also do not include any known suitable nesting habitat; except for areas of old fill material, most of the site is too wet, too densely vegetated, or has soils too thin for nesting. Nesting that may have occurred on-site likely would have taken place on the upland fill in the eastern part of the parcel. Although eggshell fragments from nest predation (by raccoons and other mammals) are frequently observed at River South and some other nearby sites, this has not so far been noted at Middle Parcel. Perhaps the greatest limitation is the relatively small size of Middle Parcel; the Blanding's turtle is a very mobile species with individual movements sometimes exceeding a kilometer. Thus, Middle Parcel could support at least some needs of a few individual turtles for some limited time, but it seems less likely that individual turtles would remain within the site for extended periods of time. Movement into or out of the site may be from the north and possibly from the east via culverts and ditches connecting to the Des Plaines River; a historically scraped area on the western edge just inside the

berm, and the ditches east of the site are among the few relatively level pathways in and out of Middle Parcel. Three sets of railroad tracks with only a few level crossings form a filter barrier for overland crossing especially for smaller turtles. The Middle Quarry to the south, Rt. 53, and developed lands to the west are formidable barriers to turtle movements in those directions.

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Based on the above information, and especially on documented nesting at Far North Parcel and at River South (based on a hatchling Blanding's turtle captured there in the fall of 1995), it is assumed that adult Blanding's turtles periodically cross Middle Parcel or forage/reside there for some period of time. This is most likely to occur in late spring or early summer when female turtles are moving to or from nesting sites and turtle activity in general is relatively high. Based on the findings of Feng and Dreslik (2015) some nesting may also occur on Middle Parcel, most likely in the eastern part on upland. Adult males or dispersing juveniles could potentially also cross the site. However, the near absence of open water or diverse deep emergent marsh, the abundance of dense monotypic *Phragmites*, and the scarcity of invertebrates and small vertebrates documented during larval dragonfly studies (Mierzwa and Webb 2009) are believed to limit the duration of turtle presence on Middle Parcel. Because of the absence of permanent or semi-permanent deep open water or emergent marsh, the limited area of juvenile habitat (shallow semi-permanent sedge-dominated wetlands), and shallow depth to bedrock which may limit adequate hibernating refugia from winter freezing, it is believed that not more than a few adult Blanding's turtles are likely to be present on Middle Parcel at any one time. The rationale for this estimate is explained below.

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The population estimate is derived from a simple analysis of Blanding's turtle density at Lockport Prairie. Using the Banning et al. (2006) population estimate of 42 turtles at that site, and an area of 254 acres (the extent of the dedicated Illinois Nature Preserve) yields an estimate of 0.165 Blanding's turtles per acre. Extrapolating the same density to the 29.14 acres of estimated potential turtle habitat at Middle Parcel (Figure 12, Appendix A) would yield an estimate of 4.8 turtles for the entire site. However, Lockport Prairie includes multiple known core areas of deep semi-permanent marsh which support much of the turtle population, and the site is large enough to allow multiple activity centers for each turtle. Activity centers tend to coincide with the core areas of semi-permanent marsh, but at any given time not every core area of habitat will be occupied as an activity center, and individual Blanding's turtles typically move among several activity centers in a season. Movements can cover considerable distances. For example, an adult female Blanding's turtle captured near the Illinois-Wisconsin border and tracked using radio telemetry moved 228 meters in the first 24 hours after release, and an additional 537 meters over the next five days before settling into a marsh complex for several weeks. Later the turtle returned to near its original location, covering more than 800 meters in a few days (Mierzwa and Thiele 1996). In McHenry County Illinois, Rowe and Moll (1991) documented mean daily movements of 44.5 meters within activity centers, duration of presence within one activity center ranging from eight to 55 days, and distances between activity centers of up to one kilometer.

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The absence of core wetland habitat, the constrained size (individual turtles frequently and routinely move greater distances than can be contained within Middle Parcel), and the presence of non-habitat in adjacent areas to the west and south suggests that Middle Parcel may not be able to support a density of turtles similar to a large preserve with extensive prime habitat including Des Plaines River backwaters and several large ponds. In addition, the 29-acre Middle Parcel area cited above includes extensive areas of common reed-dominated marsh which are unlikely to support adult Blanding's turtles. If a high-quality 29-acre portion of Lockport Prairie with core habitat and surrounded by much larger areas of good quality habitat is capable of supporting five Blanding's turtles, it is assumed that a lesser-quality area of 29 acres at Middle Parcel, with no core habitat and

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surrounded by non-habitat or degraded habitat would support fewer adult turtles and that those turtles would not likely remain on the site for long periods of time. A few additional hatchlings or juveniles may also be present until they disperse. This estimate is consistent with the results of INHS' recent (May-June 2015) survey that found six juvenile Blanding's turtles on Middle Parcel within two months (Feng and Dreslik 2015).

Therefore, as many as eight Blanding's turtles (adults, juveniles, and hatchlings) could be present on Middle Parcel at any one time. Blanding's turtles are also known to occur on ComEd Parcel in or near where restoration activities that could result in take will occur, including four that were found in 2015 (Feng and Dreslik 2015). The portions of North and Far North Parcels that may be developed during the permit period contain old field and buckthorn thickets on fill and are not considered potential Blanding's turtle habitat (Figure 12). However, turtle habitat on these two parcels potentially could be impacted by a reduction in groundwater levels from mining Middle Parcel. These impacts are expected to be largely off-set by the abundant surface water supply to the wetlands on these parcels as well as habitat improvements. As discussed above, HMS will implement numerous AMMs to avoid taking any Blanding's turtles during mining and any development and restoration activities; therefore, HMS does not expect to take more than six (6) Blanding's turtles. However, as a precaution, HMS is requesting take of up to twelve (12) Blanding's turtles during the permit period.

Spotted Turtle

Spotted turtle presence has been documented at three locations in Will County: Lockport Prairie Nature Preserve, Romeoville Prairie Nature Preserve, and on private land adjacent to a quarry north of Romeoville Prairie (Anthonysamy 2012; Banning et al. 2006; Mauger, pers. comm.). The two nature preserve populations are extant, while the northern population is known from only a few specimens and is believed to be extirpated. The Lockport Prairie population was estimated at 81 turtles, or 2.2 per hectare (Banning et al. 2006). The Romeoville Prairie population is thought to be considerably smaller, although no estimate is available.

Spotted turtles have never been reported on Hanson Material Service property despite field work nearly every year since 1994. While much field work has taken place in summer when spotted turtles are rarely surface-active, efforts have been made to search for the species at River South and Middle Parcels during the spring months especially in the mid-1990s (Mierzwa unpublished field notes) and including immediately after prescribed fire on River South, Middle, North, Long Run and ComEd parcels. These efforts resulted in multiple observations of Blanding's and painted turtles on some sites but not spotted turtles. In addition, a survey by INHS in May and June 2015 of Middle Parcel and other HMS parcels found eleven Blanding's but no spotted turtle.

Spotted turtles at Lockport Prairie and Romeoville Prairie have much smaller home ranges (2.2 ha and 1.8 ha minimum convex polygon for males and females, respectively) and mean daily dispersal distances (12.2 and 14.7 meters for males and females, respectively) than Blanding's turtles (Anthonysamy 2012). Spotted turtles also tended to be limited to relatively high-quality shallow marshes and sedge meadows in the interior of the sites, and "almost never" used peripheral wetlands which tended to be more silted (Anthonysamy 2012). Most spotted turtle observations have been in the central or southern parts of Lockport Prairie and none were at the north end of the preserve close to Route 7 (Feng and Dreslik 2015; Banning et al. 2006; Mierzwa 1988). Unlike other species of turtles, spotted turtles do not use the Des Plaines River or adjacent riparian areas for dispersal (Anthonysamy 2012; Banning et al. 2006). Radio telemetry studies documented that while Blanding's turtles at both nature preserves often moved considerable distances onto adjacent

sites, spotted turtle movements were restricted to the interior areas of the preserves and no off-site movements were noted (Banning et al. 2006).

5 Because intervening barriers, very small home ranges, and very short movement distances likely preclude long-distance dispersal, and because extensive field work by numerous individuals over a 20-year span has failed to document spotted turtle presence on Hanson Material Service property, the population size is assumed to be zero. During the 20-year study period seven other turtle species (snapping turtle, painted turtle, red-eared slider, musk turtle, Blanding's turtle, eastern spiny softshell, and northern map turtle) have been documented on or adjacent to one or more HMS parcels (Feng and Dreslik 2015; Mierzwa, unpublished field notes).

10 As explained above, it is very unlikely that spotted turtles are present on Middle Parcel or other HMS parcels. It is even less likely that they are found on ComEd Parcel, where restoration activities that could result in take will occur, because it is separated from its known habitat areas by a river and two canals, and they were not found in 2015 surveys. HMS will implement numerous AMMs to avoid taking any spotted turtles that may be present during both mining and any development or restoration activities; therefore, HMS does not believe that take of any spotted turtle will occur. However, as a precaution, HMS is requesting take of up to two (2) spotted turtles during the permit period.

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5.2.5 Turtle Impact of Take

Blanding's Turtle

25 Take is requested for a total of twelve Blanding's turtles. As many as eight Blanding's turtles (adult and juveniles) are estimated to use the 29.1 acres of potential foraging and dispersal habitat on Middle Parcel. Removal of dolomite prairie and seasonal marsh communities at Middle Parcel would result in a direct loss of dispersal habitat and potential (but limited) foraging habitat. Core area habitat for adult turtle is not present on Middle Parcel because diverse permanent marsh with open water and vegetated areas is not present on site, the site has dried during at least part of most years since the onset of monitoring, and because prey items are limited. Although exclusion fences and preconstruction surveys would be implemented to avoid and minimize impacts, the take request is intended to account for the possibility of overlooking any turtle that may be present on-site during work or any inactive turtles within the site prior to the beginning of work. Potential impacts to habitat in parcels immediately north of Middle Parcel and the potential take and loss of 0.39 acres of potential habitat during the wet-mesic prairie transplant in ComEd Parcel is also factored into this take request.

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35 The Blanding's turtle is not federally listed or proposed for listing at this time. The Center for Biological Diversity filed a petition on July 11, 2012, seeking Endangered Species Act protection for 53 species of amphibians and reptiles including the Blanding's turtle. The 90-day finding was published on July 1, 2015 and determined that listing may be warranted for the Blanding's turtle. The species is included in this Habitat Conservation Plan because of its State of Illinois status and because the possibility of a proposal for federal listing and eventual listing cannot be precluded during the life of the HCP. Thus, Blanding's turtle is considered a Covered Species at the federal level under this HCP.

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45 The take calculation above describes the reasonable worst-case estimate of take in individuals by HMS including instances where the impacts to habitat rise to the level of potential harm. The take

analysis builds on the take calculation by further explaining the anticipated impact this reasonable worst-case take is anticipated to have on Blanding's turtle at the individual and population level.

Individual Level

5 Based on the assessment of the potential biological impacts and take in this HCP, Covered
Activities that can cause take (that were not avoided or self-mitigating) included only the removal
of foraging habitat, movement/dispersal corridor, and possible nesting habitat during the surface
mining of Middle Parcel. This mining will result in the loss of 29.1 acres of habitat potentially used
10 by an estimated population of up to eight individuals (adults, juveniles, and hatchlings). Mining
Middle Parcel could also impact habitat on North and Far North Parcels. These impacts if they
occur are likely to be minor because the wetlands on these parcels are supported by surface water.

Evidence of nesting on Middle Parcel (juvenile turtles) was first documented in 2015 (Feng and
Dreslik 2015). Nesting, if it occurs, is likely limited to areas of upland fill because most of the rest
15 of the site has saturated soils through the winter and spring months. In addition, soils on most of the
site with natural vegetation are less than 18 inches deep to bedrock, limiting potential nest depth
and placing eggs or juveniles at winter freeze risk in cold years with little insulating snow cover.
Thus, the presence of nests is inferred only by the presence of juveniles.

20 The take estimate also allows for the possibility that turtles would be present and undetected by
biological monitors and would not move off the site on their own after installation of exclusion
fences or would intersect fences and return to the interior of the site before being detected. In this
event there is some risk of direct impacts to Blanding's turtles during overburden removal. In
25 addition, direct impacts to Blanding's turtles from mining operations on Middle Parcel will be
avoided or minimized through the implementation of a number of other measures described in the
previous section (5.2.3).

Removal of vegetation at Middle Parcel will displace Blanding's turtles that would have used that
habitat in future seasons and result in indirect impacts. Once exclusion fences are in place any
30 movement from other locations into or through Middle Parcel would be precluded. Because
Blanding's turtles have large home ranges and move between core areas, displaced animals are
expected to use North Parcel, Far North Parcel, and River North Parcel. Habitat restoration will
occur on all three of these parcels. Ponds and river backwaters on River Parcel also offer potential
habitat, especially after restoration activities remove invasive species and increase habitat diversity.
35 All four of these parcels will be protected under this HCP.

Because there is no suitable habitat to the west of Middle Parcel, where IL Rt. 53, agricultural
fields, a quarry, and residential subdivisions predominate; or to the south, where an existing quarry
is present; loss of Middle Parcel is not expected to disrupt migration corridors. Turtles can continue
40 to use River Parcel immediately east of Middle Parcel along the river. To reach the next known
occupied and suitable site to the south (River South Parcel, more than 1,500 m distant) already
requires that animals move to or almost to the Des Plaines River. Proposed mining activities will
not affect the river or riverbank.

45 Although Blanding's turtles have been found on Middle Parcel, a number of barriers restrict their
access to the site. Deep historic fill and tree and shrub cover on the north portion of the site are a
partial barrier to the dolomite prairie, although it appears that at least a few turtles successfully
cross this area. Other more significant barriers to dispersal include a quarry to the south and three

sets of railroad tracks to the east and between it and the Des Plaines River. However, culverts and ditches are thought to offer a connection to the Des Plaines River.

5 Suitable Blanding's turtle habitat, however, is found in nearby parcels. Suitable permanent or semi-permanent aquatic habitat is known to be present on Lockport Prairie, Romeoville Prairie, and River South Parcel, and probably on River, North, Far North, and River North Parcels. Based on available observations, Blanding's turtle activity centers are believed to be present at Lockport Prairie, Romeoville Prairie, River South, in river backwaters of River North Parcel, and in a marsh complex within the utility corridor south and east of Far North Parcel.

10 Nesting was documented at Far North Parcel in 2010, and suitable nesting habitat is available in other parcels near Middle Parcel. Very similar well drained uplands are present on parts of River and North Parcels as well as Far North Parcel. All are currently accessible to turtles, and all have nearby wetland habitat for juvenile dispersal and foraging. Therefore, loss of Middle Parcel habitat is not likely to constrain future breeding opportunities for the species. Some of the proposed enhancement (e.g. thinning of trees on River Parcel and management of *Phragmites* on River South) would enhance habitat, resulting in a likely long-term net gain in available habitat for Blanding's turtle. Clearing of buckthorn and shrub cover on upland parts of River South in particular would enhance potential nesting habitat which is not currently available because of nearly complete shading. A juvenile was found near an area to be cleared in the mid-1990s, suggesting that enhancement could expand already existing breeding habitat.

25 In summary, loss of Middle Parcel habitat would reduce the area of habitat available to Blanding's turtle in the future. This loss of habitat would be unlikely to reduce breeding success because 1) the area to be impacted is not unusually high-quality turtle habitat; 2) areas of equal habitat value are available and fairly widespread in the vicinity; and 3) some areas not currently available as nesting or foraging habitat would become available to Blanding's turtles as a result of HCP restoration activities.

30 Three adults and one juvenile Blanding's turtles were found on the ComEd Parcel (Feng and Dreslik 2015) but appear to be relatively uncommon there. While restoration activities at this site, including construction of an access road, will result in the loss of 0.39 acres of habitat and may temporarily displace one or two turtles, the species will experience a longer-term net gain from habitat restoration.

35 *Population Level*

40 Congdon et al. (1993) identified demographic-level threats to Blanding's turtle populations as a result of recruitment levels insufficient to sustain populations over long periods of time. Factors contributing to low recruitment may include nest predation by artificially over-abundant omnivores such as raccoons and skunks and highway mortality of adult female turtles. Activities covered in this HCP are not likely to affect egg predation, and it may be possible to reduce road-related mortality of adult turtles by placing exclusion fencing in a way that eliminates or reduces crossings of the quarry access road; certainly, no HCP activity is expected to increase road crossings. Because HCP activities would not increase long-term population level impacts and may actually mitigate road impacts to some extent, and because of the low level of requested take relative to the regional population, the HCP activities are not expected to have a significant effect at the population level. Much larger populations are found at other nearby sites, such as LPNP, RPNP and Keepataw Preserve and likely River South.

Spotted Turtle

Although spotted turtles are not believed to be present on Hanson Material Service property, and proposed activities are not anticipated to have any impact on the species, HMS is requesting take of two spotted turtles as a precaution. This take would have no effect on the Illinois population.

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5.2.6 Turtle Compensatory Mitigation

HMS' mitigation includes creating open habitat and restoring or enhancing native open communities (i.e. mesic and wet prairie and sedge meadow) on eight of HMS' mitigation parcels (River South, Fitzpatrick Seep, River, North, Far North, River North, ComEd and Long Run), located on both the west and east sides of the river. These restoration efforts provide improved habitat for the HED and both covered turtle species. In addition, all of these parcels will be permanently protected under this HCP. A summary of the amount of Blanding's and spotted turtle habitat and potential habitat improved and preserved is found in Table 8 in Section 5.1.7. These parcels will be protected through a declaration of restrictions on each within 30 days after required permits for this project are received and any potential legal action is resolved.

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HMS will provide additional mitigation for take of Blanding's turtle by creating and enhancing nesting habitat in open upland areas (with gentle south or west facing slopes) adjacent to adult wetland habitat in River Parcel by creating bare soil areas by discing or tilling. These areas may be augmented with sand to provide appropriate loose soil and seeded with dry prairie species to prevent erosion. HMS will also remove the shrub and tree line along railroad tracks on the west side of River Parcel to reduce cover for turtle nest predators and will trap or otherwise remove egg predators, such as raccoons, in this area if there is evidence of substantial egg predation.

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5.3 Other Covered Species

Leafy Prairie Clover

The leafy prairie clover (LPC) was listed as federally endangered in 1991 (USFWS 1991). The species is listed as endangered in Tennessee (Somers et al. 1989) and Illinois (Illinois Endangered Species Protection Board 1990). Threats to the LPC include habitat loss, competing invasive species, shade suppression by woody species, and fire suppression.

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Leafy prairie clover is found only in open limestone cedar glades, limestone barrens, and dolomite prairies that have shallow, silt to silty-clay loam soils over flat and often highly fractured limestone or dolomite with frequent expanses of exposed bedrock. These habitats experience high surface and soil temperatures, generally have low soil moisture, are wet in the spring and fall, and become dry in summer (Quarterman 1989; DeMauro 1986; White 1978).

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Lakeside Daisy

The Lakeside daisy was listed as federally threatened in 1988. Threats to the survival of the species include habitat destruction, succession of overgrowth by woody species, over-collecting for gardens, inadequacy of existing regulatory mechanisms and the species' self-incompatibility. The most significant threats range-wide are habitat destruction and succession of woody species. This plant is found in dry, rocky prairie grasslands underlain by limestone. It requires open sites with full sun.

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5.3.1 Other Covered Species Activities and Impact Analysis

Leafy prairie clover

LPC is known to occur on several parcels in the Planning Area. These include: Lockport Prairie Nature Preserve, Romeoville Prairie Nature Preserve, ComEd Parcel, Long Run Parcel, Lockport Prairie East, and Dellwood Park West Nature Preserve (Figure 14, Appendix A). Some populations in some of these locations, such as Romeoville Prairie (CHU 3) and HMS' ComEd Parcel (CHU 7), are found within the ComEd ROW and easements. LPC is found on other parcels in the lower Des Plaines River Valley, but no other populations are currently known in the Permit or Planning Areas. This includes Middle Parcel where several plant surveys have been conducted in recent years (AES 2012b, 2017 and 2018).

HMS' surface mining plan includes mining the remainder of Pierce Eich and Middle Quarry and mining Middle and East Parcels. LPC is not found on any of these parcels. However, there are populations on HMS' ComEd and Long Run Parcels which are included in HMS' mitigation package. Restoration on these parcels includes activities that will use heavy equipment during the wet-mesic prairie transplant process. Potential groundwater impacts to populations found on Lockport Prairie and Romeoville Prairie will be prevented through the implementation of avoidances measures discussed in Section 5.1.3.

Lakeside Daisy

The two known Lakeside daisy sites in Will County are located in Lockport Prairie Nature Preserve (CHU 1) and Romeoville Prairie Nature Preserve (CHU 3). Potential groundwater impacts to populations found on these parcels will be prevented through the implementation of the avoidance measures (by avoiding mining or the potential impacts of mining) discussed in Section 5.1.3.

5.3.2 Other Covered Species Biological Goal and Objectives

The biological goals and objectives of the federal Recovery Plan for the leafy prairie clover include the measures described below (USFWS 1996). The end goal of the plan is delisting of the species. The recovery strategy includes enhancement and maintenance of population viability through habitat protection and management and population restoration. The delisting goal for the Illinois population will occur when a minimum of three populations ranked as high viability are protected and managed for 10 years.

Recovery Outline

1. Identify and prioritize protection, management, and restoration needs for all viable populations for each geographic region. In Illinois, the Plan identifies Lockport Prairie, Romeoville Prairie, and Keepataw Forest Preserve. *The populations found on HMS' ComEd and Long Run Parcels are not mentioned in the plan but could contribute to the recovery of the species.*
2. Evaluate potential Illinois recovery sites. One site within the HCP Planning area is considered a high potential recovery site: Lockport Prairie East.
3. Initiate and complete preserve design and implement the protection and management required to meet recovery criteria.
 - 3.1. Develop preserve designs with protection and management of LPC as a priority.

- 3.2. Implement protection – seek to obtain highest level of protection possible for parcel (Illinois Nature Preserve = highest protection).
- 3.3. Develop management plans – create management plan for parcel and address LPC specifically.
- 5 3.4. Implement management plans – implement prescribed burning, woody plant succession, exotic species control, protection from overuse and illicit activities and herbivore damage.
- 3.5. Increase population through enhancement of current populations or establish new populations.
- 10 4. Develop and implement population monitoring programs.
5. Conduct research to enhance recovery efforts.
6. Develop materials to inform the public about the status of the species and Recovery Plan objectives.

15 HMS' AMMs address many of the biological goals and objectives of the LPC Recovery Plan.

A Recovery Plan also was written for the Lakeside daisy (USFWS 1990) but its goals and objectives were not considered for this HCP because no impacts to the species are anticipated from HMS planned activities.

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5.3.3 Other Covered Species Measures to Avoid and Minimize Impacts

Leafy prairie clover

25 HMS will locate and flag all LPCs located within planned construction areas (i.e. where heavy equipment, such as trucks and front-end loaders, are used) within ComEd and Long Run Parcels. Where possible, construction activities will avoid these plants. Where it is not possible, HMS will use composite matting or will remove and transplant LPC plants to other suitable areas in these parcels or plant them back in the same location after construction is finished. Or as part of mitigation, LPC will be planted in a nursery to be used for seed production for future restoration efforts. LPC are most likely to be found in the construction area during the spoil pile removal and wet prairie transplant operations.

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Potential groundwater impacts to populations found on Lockport Prairie and Romeoville Prairie will be prevented through the implementation of avoidances measures discussed in Section 5.1.3.

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Lakeside Daisy

Potential groundwater impacts to populations found on Lockport Prairie and Romeoville Prairie will be prevented through the implementation of avoidances measures discussed in Section 5.1.3.

5.3.4 Other Covered Species Calculation of Incidental Take

Leafy Prairie Clover

45 With the implementation of avoidance measures, HMS anticipates very little (less than ten individual plants) to no take of LPC plants.

Lakeside Daisy

No take of Lakeside daisy is anticipated from HMS planned activities with the implementation of avoidances measures.

5 **5.3.5 Other Covered Species Impact of Take**

Leafy Prairie Clover

10 HMS anticipates take will be very small (less than ten individual plants) and a very small portion of the population on ComEd and Long Run Parcels and an even smaller portion of the entire population found within the Planning Area and the entire lower Des Plaines River Valley. The LPC population on ComEd Parcel was estimated to be over 1000 plants in 2006 and 2007 (M. Redmer, pers. comm., 2012). Thus, the impact of take of LPC plants from HMS activities will be insignificant.

15 *Lakeside Daisy*

No take is anticipated for the Lakeside daisy, thus there is no impact of take on the population.

5.3.6 Other Covered Species Compensatory Mitigation

20 *Leafy Prairie Clover*

If take of LPC occurs during HMS' mitigation activities for the other Covered Species, HMS will collect seed on site (and/or from recovered plants grown in a nursery) for one season and hand broadcast that seed into areas from which LPC plants were removed or other suitable areas in the same parcel. In addition, LPC likely has a viable seedbank in ComEd Parcel that will respond positively to the restoration work that is planned for the site as it has in other nearby sites (e.g. Dellwood Park and Lockport Prairie East).

25 *Lakeside Daisy*

No mitigation is needed or planned for the Lakeside daisy.

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6.0 MONITORING, REPORTING, AND ADAPTIVE MANAGEMENT

6.1 Introduction and General Requirements

5 Under the Endangered Species Act (ESA) and associated regulations, a Habitat Conservation Plan
(HCP) must describe the steps that an applicant will take to monitor the impacts of its Covered
Activities on the Covered Species (50 C.F.R. 17.22(b)(1)(iii)(B) and 17.32(b)(1)(iii)(C)(2)). The
USFWS' Five-Point Policy offers guidance for that monitoring, and provides that USFWS and the
10 applicant must ensure that the monitoring program of an HCP provide information to: (1) evaluate
compliance, (2) determine if the biological goals and objectives are being met, and (3) provide
feedback information for an adaptive management strategy, if one is used (65 Fed. Reg. 35242,
35253, June 1, 2000). The 2016 HCP Handbook states that monitoring reports must contain the
information needed to ensure the permittee is complying with the HCP and terms and conditions of
the permit as well as to determine if the HCP is meeting the biological objectives (USFWS and
15 NMFS 2016). The Handbook advises that the HCP specify the type of data and information
collected, the level of detail required, and the frequency for reporting. The monitoring, reporting,
and adaptive management described below are designed to effectively achieve the species-specific
biological goals and objectives presented in Chapter 5 of this HCP.

20 6.1.1 Monitoring

Monitoring is a repeated measurement and analysis of a resource over time to determine its status
and trend. Monitoring should be able to be replicated in space and time, and it should be repeated in
the same locations. Monitoring can be used to assess, inform, and achieve management actions and
25 objectives. Pre-activity surveys (i.e., inventories) and other studies provide baseline information
about the distribution and/or the abundance of a resource. Inventories can form a basis for the
monitoring program if replicated across time. They can also help to: (1) identify areas where
species of concern (covered and not covered) are located, (2) prioritize areas to target for
conservation, and (3) determine potential impacts to a species resulting from habitat loss.

30 An HCP must address three types of monitoring: compliance, effectiveness, and validation
monitoring. *Compliance monitoring* provides means for the USFWS and IDNR to verify that HMS
is carrying out the terms and conditions of the HCP, ITP, and ITA (i.e. doing what the applicant
said it would do). *Effectiveness monitoring* will enable the USFWS, IDNR, and HMS to evaluate
35 the effects of its Covered Activities on the Covered Species and determine whether the conservation
program of the HCP is effectively achieving its biological goals and objectives. Through
effectiveness monitoring, HMS, USFWS, and IDNR will also be able to assess the need for
implementation of adaptive management measures to improve the HCP's conservation strategy.
Validation monitoring evaluates whether models used in designing or implementing the
40 conservation program are correct. When applied to adaptive management (feedback loop), this type
of monitoring is also referred to as "iterative modeling." These three types of monitoring will be
used in conjunction with milestones that trigger adaptive management as appropriate. Monitoring is
discussed further in Section 6.2 below.

45 6.1.2 Reporting

HMS' monitoring and reporting program will: (1) document its implementation of and compliance
with avoidance and minimization measures (AMMs) and mitigation measures; (2) document both
the anticipated and actual take of Covered Species (either as individuals or surrogates, such as acres
HMS HCP
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of habitat lost/impacted); (3) evaluate the effectiveness of the conservation program; (4) assess the need for responses to changed circumstances or adaptive management; (5) document the implementation and effectiveness of any measures undertaken to respond to changed circumstances or adaptive management measures; (6) conduct validation monitoring of hydrologic parameters used in predictive modeling; and (7) explain how implementation, including funding, will continue to be assured. Monitoring reports will be submitted to the USFWS and IDNR and are described in greater detail in Section 6.3.

6.1.3 Adaptive Management

Adaptive management is an iterative process consisting of the following steps: 1) assess the problem, 2) design management, 3) implement management actions, 4) monitor system and species response, 5) evaluate if biological goals and objectives are being met, 6) adjust management, and 7) repeat. Adaptive management is a fundamental and required component of all HCPs, and it helps facilitate compliance, ensure achievement of biological goals and objectives, and allow for iterative modeling. Adaptive management is discussed further in Section 6.2.6 of this HCP.

6.2 Monitoring Plan

HMS will implement a detailed monitoring program that will track all activities covered by the HCP that require oversight to ensure compliance and/or measurement to determine effectiveness. These activities will include permitted activities that may result in take, AMMs, and mitigation measures. The combination of prior notification as well as compliance, effectiveness, and validation monitoring will ensure that HMS, USFWS, IDNR, and other parties are aware of the status of the Covered Activities, compliance with this HCP, the effectiveness of AMMs and mitigation, any biological take, and adaptive management practices. Monitoring will be performed frequently enough to allow evaluation, assessment and potential adaptive management changes and response before impacts occur to the covered species or their habitat. More detail on monitoring frequency is found in Sections 6.2.4 and the Monitoring Plans in Appendix G.

Overall implementation of the HCP will be accomplished by utilizing an HCP Implementation Team comprised of HMS and its consultants to establish and implement the overall management processes and systems. HMS will designate an HCP Coordinator, who will be responsible for monitoring compliance with the HCP, ITP, and ITA as HMS engages in the Covered Activities within the Permit Area. Monitoring of Covered Activities, including but not limited to implementation of the AMMs, mitigation, and adaptive management measures as appropriate, will be performed by HMS personnel and/or contracted environmental specialists.

6.2.1 Prior Notification

As part of HMS' commitment to facilitate communication with USFWS and IDNR regarding activities covered in this HCP, ITP, and ITA, HMS will provide prior notification of planned projects annually. This prior notification will include: (1) notification of the routine activities that will be carried out for operation and maintenance, safety, or new construction purposes, and (2) notification of whether projects or activities are in the vicinity of Covered Species or their habitat. This notification, as more fully explained below, will be provided electronically to the USFWS Chicago Field Office and the IDNR. This annual notification is for informational purposes only and no response is necessary from the agencies prior to HMS proceeding with the planned covered

project in accordance with the HCP, ITP, and ITA. However, the agencies will have the opportunity to make site-specific recommendations for HMS' consideration.

5 Prior notification information will include a general description (activity type and location) of the projects to be undertaken in the HCP Permit Area during the upcoming year. Since it may be necessary to perform projects during the year that were not originally planned, the list of projects may be periodically updated, if needed, and provided to the USFWS and IDNR points of contact prior to starting the unplanned project.

10 **6.2.2 Biological Goals and Objectives**

The biological goals and objectives for this HCP are presented in Section 1.4 of this HCP and are elaborated on further in Chapter 5. As presented in Section 1.4:

15 *Section 10(a)(2)(A) of the ESA requires that an HCP specify the measures that the permittee will take to minimize and mitigate to the maximum extent practicable the impacts of the taking of any federally listed animal species as a result of activities addressed by the HCP.*

20 As part of the USFWS Five Point Policy, HCPs must establish biological goals and objectives (65 Fed. Reg. 35242, June 1, 2000). The purpose of the biological goals is to ensure that the operating conservation program in the HCP is consistent with the conservation and recovery goals established for the species. Recovery Plan goals for each species are discussed in Section 2.2. However, this HCP is not required to result in the recovery of an ESA-listed species or contribute to the recovery objectives outlined in their respective USFWS recovery plans.

25 The biological goals for this HCP are:

- To meaningfully contribute to the conservation of the Covered Species found in the Permit and Planning Area;
- 30 • Protect Covered Species and habitat by avoiding and minimizing take of Covered Species and impacts to their habitat to the maximum extent practicable; and
- To restore, enhance, and preserve Covered Species habitat as mitigation for impacts to habitat.

35 The biological objectives that will be implemented to achieve these goals are listed below. Specifics about the actions taken to meet these goals and measurable outcomes (e.g. performance standards) to determine if goals have been achieved are found in the sections referenced below and in this chapter.

- 40 • Implement avoidance and minimization measures to prevent take of Covered Species and impact to their habitat, including impacts to groundwater (see Sections 5.1.3, 5.2.3, and 5.3.3);
- Restore potential habitat and enhance existing Covered Species habitat (see Section 5.1.7);
- Restore disturbed areas post-construction to pre-construction conditions (see Section 5.1.3, 5.2.3, and 5.3.3);
- 45 • Protect existing, restored and enhanced habitat areas (see Section 5.1.7);
- Control erosion and sedimentation from planned work (where appropriate) (see Section 5.1.3 and 5.2.3);

- Work cooperatively with adjacent landowners and regulatory agencies; and
- Implement a monitoring program to track the progress of avoidance and minimization measures (AMMs) and mitigation measures (see Section 6.2.3, 6.2.4, and 6.2.5).

5 **6.2.3 Compliance Monitoring**

Overview and Term

10 Compliance with the terms and conditions of the HCP, ITP, and ITA will be ensured through compliance monitoring (defined in Section 6.1.1 above). Compliance monitoring will take place before, during, and after Covered Activities occur, as well as before, during, and after restoration/enhancement measures are implemented in each parcel. Covered Activities (e.g. mining) will be monitored as long as they last (defined as 30 years in this HCP), and restoration and management activities also will be monitored for compliance as long as they are being implemented.

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Compliance Monitoring - General Methods and Personnel

20 Compliance monitoring will be conducted to ensure that all Covered Activities, as well as AMMs and mitigation measures, are conducted as planned and described in the HCP and associated documents (e.g. the Restoration Plan), and to take corrective action whenever they are not. For example, successful implementation of AMMs (addressed in Chapter 5 of this HCP) will be monitored and documented by one or more acceptable methods, such as visual field inspection, during implementation of Covered Activities. The effectiveness of AMMs will also be monitored and is discussed in Section 6.2.4.

25 As described in Chapter 5, for certain Covered Activities (i.e. involving earth moving or other use of heavy equipment) in known or possible habitat areas for Covered Species (i.e. covered turtles and LPC), HMS will perform a pre-activity survey (i.e. inventory). Earth moving activities include overburden removal in Middle Parcel and transplant activities in ComEd Parcel. These surveys will be done by contracted ecological consultants who meet qualifications established by USFWS and IDNR. When a Covered Species is found during one of these surveys, the measures detailed in Chapter 5 will be taken to avoid take of the species.

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35 HMS will develop and utilize a “project tracking database” to manage monitoring and implementation data to support the annual report described in Section 6.3 below. Specifically, to assist with compliance monitoring, HMS will monitor and track the following information in the project tracking database:

- All implemented Covered Activities;
- All AMMs to be applied to Covered Activities;
- 40 • All implemented mitigation activities;
- All AMMs to be applied to mitigation activities;
- Total number and percentage of Covered Activities and mitigation activities for which AMMs were implemented;
- The number and locations of Covered Activities and mitigation areas where Covered Species were identified on or near a worksite, and the AMMs implemented at those worksites;
- 45 • Total take of each Covered Species and the mitigation measures taken to compensate for such take over the term of the permit; and

- Comparison of HMS' requested versus actual take.

5 All of this information will be included in the annual report to be submitted by HMS. This documentation will be used to verify that HMS is complying with the HCP, ITP, and ITA, including proper implementation of AMMs and mitigating for any take of Covered Species. The monitoring section of the annual report will provide details of mitigation actions, including descriptions of these actions and documentation of real property transactions.

10 Compliance monitoring will address possible impacts to hydrology (groundwater and surface water, both on and off the HMS property) and Covered Species and habitat (as they relate to mining and restoration/mitigation activities).

Hydrology Compliance Monitoring

15 Hydrology compliance monitoring includes evaluating the implementation of the AMMs, including their installation and management. AMMs will be installed to enhance the groundwater resources in the form of infiltration galleries in the River South Bluff Parcel and an infiltration pond located in the FPDWC property on the southwest corner of Route 53 and Renwick Road. The evaluation of the hydrology-related AMMs will provide verification that they have been installed as proposed.

20 Any modifications to the design or operation of the AMMs will be reported in the construction documentation report(s). Variations to the design, implementation and/or operation of the AMMs may occur during final design and/or construction. Modifications to the preliminary design of the AMMs may occur to account for changed conditions in the field that are different than anticipated or changes to optimize system performance. Optimization modifications may include ways to

25 reduce water or power usage or implement new monitoring technologies. The documentation report(s) of the AMMs will provide confirmation that the AMMs have been constructed appropriately and report modifications from preliminary designs. The documentation report(s) of the hydrology-related AMMs will be prepared within 180 days of construction completion and will be signed and sealed by a Professional Engineer registered in the State of Illinois. Documentation

30 reporting for the River South infiltration galleries and FPDWC Property Pond may be provided together or separately depending on the timing of their construction. After construction, the maintenance of the infiltration gallery and pond will be monitored to ensure proper functioning. More details on how the hydrology related AMMs will be inspected and monitored are found in Section 6.1 and 6.2 of the Groundwater Monitoring Plan included in Appendix G-1.

35 Compliance monitoring also will be used to verify that protocols set forth in the Groundwater Monitoring Plan are being followed. Compliance monitoring activities will consist of evaluating the data collection processes and frequencies for monitoring groundwater levels, temperature and water quality. The frequency of groundwater level measurements, groundwater quality sample collection, and documentation reporting will be compared to those set forth in the Groundwater Monitoring Plan in Tables 2-2, 2-4A, 2-4B, 2-5A, and 2-5B. The Groundwater Monitoring Plan is included in Appendix G-1. Compliance monitoring evaluations of field data collection and reporting will be provided annually.

45 Surface Water Resources

Surface water resources will be protected through erosion control measures implemented for any earth moving activities covered under the HCP. These activities include overburden removal in Middle Parcel, the wet-mesic prairie transplant in Middle and ComEd/Long Run Parcels, and

5 construction of FPDWC Pond and River South Bluff Parcel infiltration galleries. An erosion control plan, including a Stormwater Pollution Prevention Plan (SWPPP) will be developed for these projects. Implementation of these plans will be monitored, as required by the permitting agency, for compliance. An erosion control plan for the wet-mesic prairie transplant is found in the Restoration Plan Set (Appendix F).

Compliance Monitoring of Covered Species and Habitat

10 Numerous avoidance and minimization measures (AMMs) will be implemented during mining operations and restoration activities to avoid impacts to the Covered Species (see Chapter 5).

The five species covered under this HCP are listed below:

- Hine’s emerald dragonfly (HED) and its critical habitat
- Blanding’s turtle and its habitat
- 15 • Spotted turtle and its habitat
- Leafy prairie clover (LPC)
- Lakeside daisy

Compliance Monitoring During Mining Operations

20 Several AMMs will be used during the mining process to avoid taking adult HED or covered turtles. AMMs for the HED are listed under Operational Avoidance Measures in Section 5.1.3 and for Blanding’s and spotted turtles in Section 5.2.3. Personnel will monitor and enforce the proper implementation of the AMMs unless noted otherwise. A check list of AMMs will be developed and all applicable measures will be checked frequently enough to ensure their proper functioning (or as specified in the AMM description) during mining operations to ensure compliance. All activities
25 not in substantial compliance will be corrected that day or discontinued until corrected. A report listing all non-compliant activities (if they occur) and corrective actions taken will be generated and submitted to USFWS and IDNR monthly. In addition, mining progress will be tracked annually by measuring the size and depth of the mines. Mining operations will not occur in or near LPC or LSD
30 habitat; thus, no AMMs are planned.

Compliance Monitoring During Restoration Efforts

35 Several AMMs will be used during restoration efforts to avoid taking adult or larval HED, covered turtles, or the Leafy Prairie Clover (LPC). AMMs for HED are listed under Avoidance During Restoration in Section 5.1.3, for Blanding’s and spotted turtle in Section 5.2.3, and for LPC in Section 5.3.3. Personnel will monitor and enforce the proper implementation of these AMMs unless noted otherwise. A check list of AMMs will be developed and all applicable measures will be checked frequently enough to ensure their proper functioning (or as specified in the AMM description) during restoration activities to ensure substantial compliance. All activities not in
40 compliance will be corrected that day or discontinued until corrected. A report listing all non-compliant activities (if they occur) and corrective actions taken will be generated and submitted to USFWS and IDNR monthly. Restoration efforts will not occur in or near LSD habitat; thus, no AMMs are planned.

45 Compliance Monitoring of Wet-Mesic Dolomite Prairie Transplant

Unless noted otherwise, personnel will monitor and enforce the proper implementation of all AMMs associated with the salvage and transplanting of 6.01 acres of wet-mesic dolomite prairie (see Chapter 5 and Restoration Plan Set, Appendix F). Prior to and during the transplant, personnel

will ensure that the correct equipment and techniques are used to complete the project successfully, (as specified in Section 5 and the Restoration Plan Set) including:

- Appropriate equipment: removal vehicle, bucket/scrapper, transport vehicle, unloading and placement vehicle; and
- Appropriate technique: removal, transport, and placement in transplant location.

Personnel will ensure proper implementation of all *Mining Operations* and *Mitigation/Restoration Efforts* AMMs (referenced above) applicable to construction of the access road, which will be installed in the Long Run and ComEd Parcels to enable the wet-mesic dolomite prairie transplant.

A check list of AMMs will be developed and all applicable measures will be checked frequently enough to ensure their proper functioning (or as specified in the AMM description) during transplant operations to ensure substantial compliance. All activities not in compliance will be corrected that day or discontinued until corrected. A report listing all non-compliant activities and corrective actions taken will be generated and submitted to USFWS and IDNR monthly.

6.2.4 Effectiveness Monitoring

Overview and Term

As described under Section 6.1.1 above, effectiveness monitoring will enable the USFWS, IDNR, and HMS to evaluate the *effects* of the Covered Activities on Covered Species and determine whether the conservation program of the HCP is *effectively* achieving its biological goals and objectives. Under this HCP, HMS will *monitor the effects* of the Covered Activities that require compensatory mitigation. In addition, there are several AMMs, as well as mitigation measures, that will be *monitored for effectiveness* as part of the adaptive management program. Effectiveness monitoring will be initiated upon implementation of the Monitoring Plan and will continue as long as Covered Activities last (estimated to be 30 years in this HCP) and restoration and/or management activities (and other mitigation efforts) continue (also until the end of the 30-year permit period or when the permit is terminated).

Effectiveness Monitoring - General Methods and Personnel

In addition to the items listed in Section 6.2.3 above, HMS' HCP Coordinator will compile a list of all activities performed, indicating the type of activity, where it occurred, the amount of habitat affected, the AMMs implemented, and the actual or calculated take of Covered Species (i.e., numbers of individuals or acres of habitat). Specifically, the HCP Coordinator will use data collected during the previous year to report the areas of temporary and permanent habitat loss based on the size of the work area (determined during any pre-activity surveys or other site-specific evaluation) and the percentage of that area providing suitable habitat for each species. For each species, the total acreage (across sites) of occupied or potential habitat impacts will be calculated. Activities which result in take that can be monitored in terms of individuals of Covered Species or acres of habitat will also be tracked and included in the overall annual compensation calculation.

HMS will be responsible for monitoring the effectiveness of mitigation measures. Appendix G (G-2 and G-3) contains current monitoring protocols for habitat and the HED and will be updated as needed during the life of the permit. It is the responsibility of HMS to ensure that the effectiveness monitoring is performed sufficiently, completely, and in accordance with this HCP, the ITP, and ITA. Frequency of effectiveness monitoring for the HED and habitat is discussed in their respective sections below in this section. HMS will report monitoring results to the USFWS and IDNR. If the

results from the monitoring of the mitigation measures demonstrate a lack of success, additional mitigation measures will be implemented to compensate for the shortfall as discussed in the adaptive management section (6.2.6) of this chapter and changed circumstances sections in Chapter 8.

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In addition to monitoring effectiveness of the mitigation, HMS is responsible for evaluating the effectiveness of avoidance and minimization measures (AMMs). For each AMM, HMS and the USFWS evaluated the risk to the species if it were to fail and the likelihood that the AMM would be successful. This evaluation identified AMMs with a moderate to high degree of risk to the species in the event the AMM fails (e.g. River South Bluff Parcel infiltration galleries). Since River South Parcel is the parcel with larval habitat located in closest proximity to the proposed surface mining in the Pierce Eich Quarry, the potential risks to the Covered Species are greatest in this area. Therefore, HMS has developed a monitoring strategy to account for this risk. Groundwater levels will be monitored at much higher frequencies in the River South/River South Bluff Parcel than other parcels during each monitoring period. Remote monitoring devices, such as telemetry devices, will be installed so that near-real time monitoring data will be accessible via cellular or satellite modems.

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At least two monitoring wells within the River South (RP-2S) and River South Bluff (RP-1D) Parcels will have remote monitoring devices installed in them to record water levels every four hours. The data collected from these remote monitoring devices will be retrieved and reviewed on a weekly basis. Additional remote monitoring devices will be installed within wells RP-1S, RP-2D, MW-7C, MW-12C, and CEP-4D. These instruments will record water temperature and groundwater levels every four hours. The W-1 seep and well G-102 will have automated devices deployed for near-continuous monitoring (every four hours) of temperature and specific conductance. The instrument at G-102 will also record water levels. These instruments will be accessed for data downloads at least monthly.

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Process control monitoring devices installed within the infiltration gallery systems will provide information during operation of the infiltration galleries so that modifications to the infiltration system can be tracked to respond to changing conditions. Thus, uncertainty of the infiltration gallery effectiveness is addressed through greater monitoring frequencies, systems capable of remotely providing groundwater level data and a means to respond to changing conditions.

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If water levels are not maintained within targeted ranges using estimated infiltration rates, then additional water volumes will be infiltrated. The three proposed galleries will be designed to have excess capacity, as will the conveyance piping from the Middle Quarry sump. If infiltration capacities are reached, or the distribution of the water is insufficient, additional avoidance measures will be incorporated, such as installing an additional gallery(s) and/or supplementing more water. Documentation report(s) of physical enhancement(s) to AMMs will provide information on the modifications from preliminary designs and will be prepared within 180 days of construction completion. The documentation report will be signed and sealed by a Professional Engineer registered in the State of Illinois. This approach of iteratively collecting and assessing data, along with providing enhancements if necessary, is consistent with the adaptive management program described in Section 6.2.6.

Compliance monitoring (confirmation that the AMMs are implemented appropriately) will be conducted and reported prior to effectiveness monitoring. As with compliance monitoring, effectiveness monitoring will address impacts to hydrology as it relates to groundwater and surface

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water, both on and off the HMS property within the Planning Area and on the Covered Species and their habitat as they relate to mining and restoration activities.

Effectiveness Monitoring of Hydrology

5 Hydrology will be monitored at the mitigation parcels to measure the effectiveness of the AMMs, restoration, and mitigation efforts. Success of hydrologic AMMs will be determined by the collection and evaluation of field monitoring data. The evaluation of monitoring data will provide documentation that: (1) *groundwater hydrology* is being maintained in current HED larval habitat areas that could be affected by HMS’ activities, (2) *groundwater quality* is also being maintained in 10 these same areas, and that (3) *surface hydrology* suitable for the Covered Species is being maintained or improved in areas of habitat restoration and hydrology enhancement. Evaluation of monitoring data will include documenting that groundwater hydrology is being maintained within the historical range of background levels in known and potential larval areas that could be affected by mining. 15

Groundwater Resources

HMS will: (1) install groundwater hydrology AMMs to protect groundwater-fed habitats in parcels that could be affected by their Covered Activities, and (2) monitor groundwater hydrology in parcels that contain or may contain HED larval habitat (or areas just upgradient of these parcels) 20 and may be affected by HMS activities. In addition, groundwater levels will be monitored outside of the potential affected area, so regional or “background” trends in the Silurian Aquifer can be related to trends within potentially affected areas. Parcels in CHUs that modeling shows with confidence will not have their groundwater impacted by HMS activities (or wetlands that are surface water fed) will be monitored less frequently. Details of the effectiveness monitoring of 25 groundwater hydrology AMMs are addressed in Section 3 and 4 of the Groundwater Monitoring Plan, which is included in Appendix G-1.

Shallow groundwater in and around transplant areas and other habitat restoration areas will be recorded routinely. Groundwater levels throughout the project area will be monitored using the 30 scheme discussed in Section 4 of the Groundwater Monitoring Plan included in Appendix G-1. Monitoring frequencies vary based on location and time period within the HCP Permit as outlined on Tables 2-2, 2-4A, 2-4B, 2-5A, and 2-5B of the Groundwater Monitoring Plan.

The hydrology monitoring effort will collect data that can be used to evaluate whether the HCP is 35 effectively achieving its goals and objectives. As part of this process, the AMMs will be monitored for effectiveness as part of the adaptive management program. The groundwater monitoring program (Appendix G-1) has been developed with timeframes of data collection and evaluation that are short enough so that additional monitoring and potential adaptive management changes can occur in a timely manner. The following sections summarize the monitoring process for 40 groundwater levels and water quality: routine, verification, assessment, adaptive management and mitigation.

Routine Monitoring – Groundwater levels and water quality will be routinely monitored at 45 numerous locations as identified in Table 2-2, 2-4A, 2-4B, 2-5A, and 2-5B of Appendix G-1 to provide sufficiently frequent information to effectively evaluate site conditions. Data collected during routine monitoring will be compared to the historical range of water levels (lower 5% of observed water levels absent of drought periods as displayed on Table 2-2) and water quality data (Attachment 2-Table 1) found in Appendix G. Routine monitoring is considered to be a part of each of the monitoring time periods, which include: First Year of Operation, Regular Operation, Pierce

Eich Quarry Recovery Period and Post-Pierce Eich Quarry Performance Period. Frequency of routine monitoring depends on monitoring time period and monitoring location. At two locations (RP-1D and RP-2S), telemetry units will be affixed to the wells so that water level data that is recorded several times per day can be accessed remotely. Telemetry units will be accessed weekly for data download and review. Manual water levels will vary from weekly to quarterly depending on the monitoring period. Field personnel will record water levels using an electronic tablet with prescribed templates that will alarm the user of a potential groundwater trigger. Verification will occur immediately by re-checking the water level and meter to confirm the first measurement was not erroneously read or recorded by the field staff. This process will reduce the time between identifying a groundwater trigger and making changes in adaptive management. In the rare incidence of an instrument or tablet malfunction, a verification contingency scenario has been developed as outlined in Figure 4-1.

Verification Monitoring – This monitoring consists of a single follow-up monitoring event to confirm the result of a water level or water quality parameter concentration obtained during routine monitoring. If the water level or water quality concentration is not within the predetermined background levels, then assessment of the potentially changed conditions will be initiated. Verification monitoring will not be implemented for data comparisons of seasonal averages. Further details on the timing and procedures of verification monitoring are included on the monitoring decision flow charts included in the Groundwater Monitoring Plan (Appendix G-1) as Figures 4-1, 4-2, 4-2, and 4-4.

Assessment Monitoring – This monitoring consists of monitoring water level or water quality in an individual parcel or across several parcels to obtain the information to assess variations from the routine monitoring data. Water level and/or water quality assessments will be based on the data collected during a period of more frequent measurements at wells near where the observation(s) occurred as well as monitoring of surrounding wells and seeps. The assessment monitoring report will include a summary of conditions as they compare to the planned AMM operation and performance. In addition, the assessment report will provide an evaluation of any change in water levels, identify potential causes, and identify adaptive management action(s) that have been taken or will be evaluated to support the groundwater hydrology of local habitats. Details of assessment monitoring can be found in Section 4.2.3 of the Groundwater Monitoring Plan (Appendix G-1).

Adaptive Management – The strategies implemented for adaptive management consist of an iterative process of routine monitoring, assessment monitoring and implementation of revised operational plans, if necessary. The performance and operation of the avoidance measures will be routinely monitored through inspections and routine monitoring. Field data will be reviewed to verify that avoidance measures are operating as planned. Changes to avoidance measures will be implemented (if possible) to mitigate for the potential for changed conditions. The details of the Adaptive Management process for groundwater impact avoidance measure(s) are found in Section 4.2.4 for water level, Section 4.3.4 for water quality, and on the decision flow charts included as Figures 4-1, 4-2, 4-2, and 4-4 of the Groundwater Monitoring Plan (Appendix G-1).

Contingency Measures - If modifications to avoidance measures cannot be completed or are not effective, then contingency measures will be pursued in consultation with regulatory agencies. Evaluation of contingency options will assess how project goals can be achieved through alternative means.

If measured groundwater levels or water quality parameters continue to fall outside of historical or anticipated range of background levels, and the data indicates that other parties or circumstances outside the control of HMS are the cause, HMS will not be held responsible for the changes (see Chapter 8).

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Seep Discharge

Seep discharge will be routinely monitored downgradient of the River South Bluff Parcel infiltration galleries. Water temperatures and specific conductance at the W-1 seep will be recorded every four hours so interferences from infiltrated water can be evaluated. In addition, semi-annual water quality samples will be collected from the W-1 seep discharge. Water quality samples of seep discharge at the W-1 location will be collected coincidentally to groundwater quality samples collected at well RP-8S West, which is located immediately downgradient of the northern infiltration gallery (Gallery A). Sample frequencies are summarized on Table 2-4A of Appendix G-1 for W-1 seep and RP-8S West. Water quality samples will be analyzed for general constituents, metals, major anions, as well as field stabilization parameters, including pH, dissolved oxygen, conductivity, and temperature as tabulated on Table 2-4B of Appendix G-1. Results of seep water quality will be compared to the historical dataset included in Attachment B-2 of Appendix G-1 and evaluated in the same fashion as groundwater in accordance with the flow chart depicted in Figure 4-2 of Appendix G-1. Seep monitoring is considered part of the groundwater monitoring program and therefore included in Appendix G. Specific discussion on water quality sampling procedures, parameter lists, and frequency is included in Section 4.3 of the Groundwater Monitoring Plan.

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Surface Water Resources

Effectiveness monitoring will also include inspecting and monitoring surface water flow and quality. Surface water will be inspected or monitored in mitigation sites to determine if surface hydrology is being maintained in existing habitat areas or has been reestablished in restored habitat areas. The following methods will be used to evaluate the effect of habitat restoration activities on surface hydrology.

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- Surface water will be visually inspected in the following areas:
 - Mitigation parcels that contain HED larval habitat and where habitat restoration activities may affect site surface hydrology and larval habitat will be inspected weekly and within 24 hours of a 0.5 inch or greater rain event during construction. These inspections will focus on ensuring that mitigation activities are not changing surface water flow patterns (or water quality). Therefore, both flow patterns and turbidity will be inspected visually.
 - Areas where no HED larval habitat exists currently but may be created through adult habitat restoration. These inspections will focus on detecting improved surface water flow patterns for larval habitat. These inspections will occur monthly from April through July during the first two years after habitat restoration is complete.

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Effectiveness Monitoring of Habitat (Vegetation)

Success of restored, enhanced, and managed habitat areas will be determined by monitoring and documenting the plant community composition, structure, and diversity. Habitat monitoring methods will be similar to the ones used in the test plots study conducted in the mitigation parcels (AES 2012b). The goals of vegetation restoration/enhancement/management are to halt the degradation of current habitat and improve habitat quality in low quality or non-habitat areas. This will be achieved by reducing the abundance of invasive woody and herbaceous species in restored

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and enhanced habitat areas, reestablishing a dominance of native species in these areas, increasing native plant diversity, and restoring appropriate habitat structure.

5 To determine if the above desired changes are occurring, the following vegetation metrics will be monitored. Much of this monitoring will occur along transects. Permanent transects will be established in representative areas of each restored community (i.e. restoration zone) on each mitigation parcel or parcel group (e.g. River South and Fitzpatrick Seep). See Appendix G (G-3) for more details on vegetation monitoring methods.

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- *Plant species abundance* - Plant species cover and frequency will be measured along established transects (using quadrats) to determine:
 - % native cover, or relative importance value (RIV)
 - % alien (adventive) cover, or RIV
 - 15 • *Plant species diversity* - Calculated metric based on quadrat data or species lists collected in/around each transect or in each restoration/planting zone.
 - FQI or mean C
 - *Habitat structure* - Measure the following to quantify the change in weedy tree and shrub cover:
 - Stem counts and/or canopy intercept along established transects
 - Use aerial photographs and/or LIDAR to:
 - 20 ▪ Document the change in (i.e. reduction of) weedy/invasive trees and shrubs
 - If imagery allows, document the reduction of specific herbaceous weeds (e.g. *Phragmites* and/or cattail)
 - 25 ▪ On the ground confirmation (i.e. ground-truthing) of herbaceous weed reduction will be conducted if needed.

30 Vegetation monitoring will be done once every other year (i.e. years 1, 3, and 5) in each mitigation parcel for the first five years or until performance standards are met. A site inspection will be conducted on alternating years. For the next ten years, full (i.e. quantitative) vegetation monitoring will be completed once every three years, and a site inspection will occur each year prior to a monitoring year. For the remainder of the permit (approximately 15 years), full monitoring will occur once every five years, and a site inspection will occur twice between each monitoring event. Half of the mitigation sites will be inspected each year between the full monitoring years, so that all sites will be inspected every other year.

35 The following vegetation performance standards have been established to determine the success of the habitat restoration and enhancement areas.

- 40 • Less than 10% cover by non-native and/or weedy native trees or shrubs (e.g. green ash, box elder, or gray dogwood) in both the ground layer and the woody canopy layer within three years after the start of restoration. This standard must be met again at the end of year 5.
- At least 70% native cover in the ground layer at the end of year 3 after restoration. This standard must be met again at the end of year 5.
- 45 • None of the three most dominant ground layer plant species may be non-native species (according to Swink and Wilhelm 1994) or common reed (*Phragmites australis*) within three years after the start of restoration. This standard must be met again at the end of year 5.

These performance standards will serve as triggers for adaptive management; if a given

performance standard is not met within the time frame specified above, appropriate measures will be taken to address the issue. Adaptive management may include additional woody vegetation removal efforts, overseeding with appropriate native species, and/or additional control of undesirable herbaceous species. In addition, these performance standards are to be maintained during the life of the permit, and adaptive management will be employed as needed to achieve this.

Other Habitat Improvements

Other planned habitat improvements will also be monitored but will not be held to performance standards. These include:

- HED larval habitat restoration: Remove and reduce weedy species (e.g. cattail and willow) in larval HED areas (e.g. Emerald Meadow and areas immediately adjacent to occupied rivulets). The extent of cattails, willows, or other weedy species will be measured with a GPS or on an aerial photograph before and after treatment to calculate the area of habitat expansion. The goal of this restoration is to expand the habitat area (i.e. area with less than 20% woody species, cattail, or *Phragmites*) by 40%. If no appropriate habitat exists (as defined above) in these areas, then restoring 40% of the former habitat area will be the goal. If after two years of management, this expansion is not achieved, then management methods will be reevaluated and adjusted as needed to expand habitat. Management will continue as needed to maintain 40% expansion of the habitat area, unless no increased adult HED use of these areas is observed. The size of these habitat areas will be measured annually until the above goal is achieved and every third year while they are being managed. HMS is not required to restore larval HED habitat because no impacts to larval habitat are anticipated from their Covered Activities. These habitat improvements are being done in recognition of the importance of breeding habitat in River South Parcel to the viability of HED population in the Lower Des Plaines River Valley in Illinois.
- Turtle nesting habitat creation: Turtle nesting habitat will be created in River Parcel as described in Section 5.2.6. The condition and use of these areas will be inspected each month during the turtle active season (March 16 to Oct. 31). If, after two years, no evidence of use is observed and habitat conditions degrade (i.e. loose soil conditions are not maintained or plant species that inhibit nesting by the turtles establish in the area), then management methods will be reevaluated and adjusted as needed to restore the originally targeted habitat conditions. This reevaluation process will be repeated every two years. If it is determined that appropriate nesting habitat cannot be created at this location, then turtle nesting restoration will be attempted in another appropriate location on an HMS mitigation parcel.

Effectiveness Monitoring of Wet-Mesic Dolomite Prairie Transplant

The following vegetation performance standards have been established to determine the success of the wet-mesic dolomite prairie transplant areas.

- Native cover should be $\geq 90\%$ of the pre-transplant native cover three years and five years after transplant.
- Mean C and FQI for all transplant areas combined should be $\geq 90\%$ of the pre-transplant values three years and five years after transplant.

These performance standards will serve as triggers for adaptive management; if a given performance standard is not met, appropriate measures will be taken to address the issue. Adaptive

management may include overseeding with appropriate native species and/or additional control of undesirable woody or herbaceous species.

5 Baseline quantitative vegetation data has not been collected in the wet-mesic dolomite prairie of Middle Parcel since 2009; therefore, it will be resampled before transplant to document its current (i.e. pre-transplant) condition.

Effectiveness Monitoring of Covered Species

10 Effectiveness monitoring will be conducted for all species covered by this HCP that could be impacted by the Covered Activities (including mitigation activities) (i.e. HED, Blanding's and spotted turtles, LPC).

Hine's Emerald Dragonfly (HED)

15 The HED will be monitored in a number of HMS parcels in the Permit Area during the permit period. Adult monitoring will be conducted using the method developed and used by Ken Mierzwa and his colleagues for over 15 years to estimate density (Appendix G; G-2). Larval monitoring will be conducted using a methodology developed by Dan Soluk and used by his team as well as by Mierzwa's team (Appendix G; G-2). Other monitoring methods, approved by the USFWS and IDNR, may be considered as well. Data from previous HED monitoring as well as population
20 estimates derived from this data (Soluk and Mierzwa 2012) will serve as a baseline for all HED monitoring conducted as part of the HCP.

HMS will monitor HED on their parcels that will be restored or enhanced or potentially could be impacted by a Covered Activity (e.g. mining). HMS will monitor:

- 25
- Newly restored or enhanced adult habitat areas on its parcels (i.e. Far North, River North, North, River, Long Run, and ComEd Parcels). These parcels will be monitored for adults every four years on a rotating basis (i.e. each parcel will be monitored on average every four years) until vegetation performance standards have been met. Thereafter or during
30 times when habitat is not being impacted by Covered Activities, adult monitoring will be conducted in restored or enhanced habitat areas every five years for the duration of the permit.
 - All known adult habitat areas on HMS parcels (i.e. River South and Fitzpatrick Seep) that could be impacted by mining the Pierce Eich Quarry will be monitored for adults every
35 three years while the Covered Activities (or their potential effects) continue and then every five years for the duration of the permit.
 - Point Counting of adult HED at various locations will be performed during the permit to confirm dispersal pathways and parcel connectivity. The location of the work will be determined by the results of the transects on the parcels and vegetation condition. Point
40 counting will be conducted at least ten times during the length of the permit for an average of every three years.
 - Known larval habitat areas on HMS parcels (i.e. River South Parcel) adjacent to restoration activities using heavy equipment will be sampled for larvae every two years while restoration activities are conducted. After the restoration activities are complete, the nearby
45 larval habitat will be monitored every five years.
 - Known larval habitat areas on HMS parcels that potentially could be affected by Covered Activities (e.g. River South Parcel) will have representative sampling performed for larvae and be visually inspected on an annual basis while the Covered Activities (or their potential

effects) continue. After the potential effects of the Covered Activities are permanently addressed (e.g. inundation of Pierce Eich Quarry) and temporary avoidance measures are abandoned, the parcel will be monitored for larvae every five years.

- 5 • HMS will visually inspect suspected locations of potential larval habitat (e.g. Fitzpatrick Seep, ComEd and Long Run Parcels) in restored/enhanced areas every five years after adult restoration/enhancement activities are completed for the duration of the permit.

Monitoring Direct and Indirect Effect on the HED

10 Effectiveness monitoring will measure the effectiveness of both the restoration and mitigation measures as well as AMMs. Monitoring the effectiveness of AMMs will allow for the evaluation of assumptions that were part of the calculation of take for the HED for a range of activities that result in indirect and/or direct effects.

15 HMS, USFWS, and IDNR are not aware of any studies that have monitored the response of HED populations to many of the proposed activities included in this HCP and covered by the ITP or ITA. Therefore, several assumptions were made when estimating the take and impact of take of these activities. HMS will conduct effectiveness monitoring to evaluate these assumptions and the response of HED populations to planned activities that have the potential to result in take through direct or indirect effects.

20

Indirect Effects

25 HMS will monitor the HED populations in River South during the ITP and ITA period. In addition, HMS will monitor groundwater levels within River South and River South Bluff Parcels and Lockport Prairie Nature Preserve (LPNP). The results of such studies will be used, through adaptive management, to adjust AMMs or, if necessary, Covered Activities. Adult HED monitoring schedule for River South is discussed in the HED monitoring section above. The Groundwater monitoring schedule is provided in Appendix G-1.

Direct Effects

30 The only activity that is anticipated to directly affect the HED is the removal of adult habitat in Middle, North, and Far North Parcels. Surface mining in Middle Parcel will remove approximately 40.8 acres of adult habitat and development in the other two parcels will remove 8.4 acres. Adult use of adjacent habitat (i.e. River, North, and Far North Parcels) will be monitored by HMS before, during, and after the removal of habitat from Middle Parcel. In addition, adult HED will be
35 monitored at River South (for indirect effects of mining and effectiveness of AMMs and mitigation), as well as at ComEd and Long Run Parcels (for the effectiveness of mitigation). These effectiveness monitoring activities will provide an accurate estimate of the HED population on HMS property and will assist in tracking the size of the overall Illinois population (e.g. Lower Des Plaines) throughout the duration of the permit. Adult HED monitoring schedule is discussed in the
40 HED monitoring section above.

45 If adult HED density drops 40% or more from baseline, then additional adult monitoring will be done the following summer. If lower density numbers are confirmed in the second year, adaptive management will be triggered.

If the mean HED larval population estimate for a single site drops by 40% or more from baseline, and if all streamlets monitored at that site in that year show at least a 10% decline; and if the decline

occurs across two or more consecutive larval age classes, then adaptive management will be triggered.

Blanding's and Spotted Turtles

5 All effectiveness monitoring of covered turtles will be completed as part of AMMs during earth
moving activities (e.g. mining, prairie transplant, or site development) (see Section 5.2.3). HMS
will set traps for turtles in these areas the season before work starts and will search and remove any
turtles daily during work. All moved (translocated) turtles will be monitored for a year using radio
telemetry. See Section 5.2.3 for more details about AMMs to be implemented to protect the covered
10 turtles. No other monitoring of turtles is planned by HMS.

Leafy prairie clover

LPC populations will be monitored before, during, and after restoration work in HMS' ComEd and
Long Run Parcels. Monitoring is part of the AMMs for LPC that are described in Section 5.3.3. As
15 described in this section, if restoration activities (e.g. prairie transplant) cannot avoid all LPC
populations, some may have to be transplanted.

- All LPC found and flagged within the construction area prior to the start of work will be
transplanted to other appropriate locations within ComEd or Long Run Parcels.
20 Transplanted plants will be flagged, and their location will be recorded with a GPS so they
can be found during monitoring.
- Transplanted plants will be monitored during and after construction. Plants will be visually
inspected to determine survivorship.
- LPC lost during their transplant or the prairie transplant construction activities will be
25 replaced by seeding or planting LPC in appropriate areas of ComEd or Long Run Parcels.

Lakeside Daisy (LSD)

Within the Planning Area, Lakeside daisy is found only in Lockport Prairie and Romeoville Prairie.
Potential groundwater impacts to these populations will be prevented through the implementation of
30 avoidance measures discussed in Section 5.1.2. Therefore, no monitoring of LSD is planned.

6.2.5 Validation Monitoring

35 Validation monitoring is conducted to test the validity of the basic assumptions that underpin the
understanding of the project. Validation monitoring will be used to confirm the cause and effect
relationship between the project controls (e.g. AMMs such as infiltration galleries or infiltration
pond) and physical (water level/water quality) response.

40 Extensive groundwater modeling completed for the HMS Romeoville Quarry indicates that the
proposed AMMs will be effective in avoiding or minimizing potential hydrology impacts from
mining the remaining surface reserves in Pierce Eich and Middle Parcels. Uncertainty in the
modeling results were reduced through an analysis of varying input parameters and assumptions in
a sensitivity analysis. A duplicate model was also created that offers a different solution to the
three-dimensional flow of groundwater. The results of the two modeling set-ups allowed
45 comparison of the results and reduced uncertainty in the ability to conservatively assess predictive
scenarios of implementation of the AMMs and quarry construction.

- The groundwater modeling simulations are examples of scientific hypotheses, and as such cannot be proven or validated (Konikow and Bredehoeft 1992). Therefore, predictive results will be tested and evaluated using revised inputs and/or assumptions as new information becomes available. If incorrect assumptions or inputs are found to have been inappropriately utilized, the results of predictive analyses may be invalidated. However, the invalidation of the groundwater model(s) is not likely since the conceptual set-up, input parameters, and solution methods have all been reviewed by experts from the USGS at each step during development. Rather, the evaluation of new information may lead to improved conceptual models, refined ranges of parameter inputs, and a new basis for evaluating the regional groundwater flow system.
- Validation monitoring will consist of comparison of future data to the groundwater models' conceptual construction, inputs, and results. Validation monitoring will be used to improve the ability of the models to analyze the groundwater flow system.
- An assessment of new data with regards to the groundwater modeling inputs, assumptions and results will be evaluated as it becomes available. Validation monitoring events, descriptions and schedules are outlined in the following table.

Table 10. Verification monitoring events and reporting scheduling.

Monitoring Period	Monitoring Event	Description
Years 1 and 2 of Permit Period	1.) River South Preliminary Testing	<ul style="list-style-type: none"> Evaluate whether head/discharge relationships observed during preliminary testing can be incorporated into the groundwater models
	2.) FPDWC Pond	<ul style="list-style-type: none"> Evaluate preliminary testing of pond to the range of flux values used in predictive modeling.
	3.) New Monitoring Wells	<ul style="list-style-type: none"> Compare hydraulic data collected at new monitoring wells to range of hydraulic conductivity inputs.
Annually	Water Quality Assessment	<p>Water Samples will be routinely collected in the River South Bluff Parcel and LPNP to assess water quality of the seeps discharging in the parcels. The specific sampling points, frequency, and parameter lists for River South Bluff Parcel and LPNP are summarized in Appendix G-1 on Tables 2-4A/B and Table 2-5A/B, respectively.</p> <p>The results will be reviewed annually to verify that avoidance measures are not having effects on water quality. Discussion of the water quality sampling is included in Section 4.3 of Appendix G-1.</p>
	Availability of New Information	<p>Conduct an assessment to evaluate if:</p> <ul style="list-style-type: none"> Any new research is available that has been conducted in the area by university, state or federal researchers that may refine data inputs and/or assumptions? <p>Any new extraction wells been installed or taken offline?</p>
	Recovery of the Pierce-Eich (West) Quarry (Only to occur after mining of the Parcel)	<p>Groundwater modeling predicts that groundwater levels in the northern portion of the River South Parcel will return to background levels within three years of plugging the tunnel under Route 53. Groundwater levels in River South/River South Bluff Parcels, FPDWC Property pond, and LPNP will be closely monitored for at least six years after the Quarry is plugged to evaluate response to the stoppage of pumping in the quarry. Groundwater levels will be evaluated to determine when flow to the galleries can be reduced and eventually shut down.</p>
Every 5-Years	Infiltration Gallery Performance Review	Every 5-years conduct evaluation of an individual infiltration gallery performance by comparing infiltration rates and corresponding water levels to the results obtained during the preliminary testing events.
Reporting Schedules		
Annually	Include validation monitoring data assessments in the Annual Report, which will be submitted annually to USFWS by March 1.	
5-Year Groundwater Modeling Reviews	Evaluate new information in the groundwater model with respect to changes to inputs/assumptions. Reviews of groundwater modeling predictive analyses will be conducted at least every 5 years.	

6.2.6 Adaptive Management

5 Overview of Adaptive Management

As introduced in Section 6.1.3, adaptive management is a process by which management practices are incrementally improved through implementation of plans that provide opportunities to learn from experience. A timely change in impact minimization and mitigation approaches in accordance

with new knowledge provides the cornerstone for a successful HCP. As new information from monitoring, research (by others), or day-to-day management becomes available, the information will be evaluated in the context of this HCP's goals and objectives.

5 The goal of adaptive management as included in this HCP is to ensure that the conservation
program measures (implementation of AMMs and mitigation for take of Covered Species) function
as desired and meet their intended biological goals and objectives. The adaptive management
process for AMMs and mitigation procedures that have significant uncertainty and consequences
10 for the Covered Species are discussed below. Specifically, data will be collected and analyzed to
confirm that AMMs are effective and that mitigation sufficiently compensates for the impact of take
of the species.

Based on the best scientific information currently available, it is expected that the HCP's
conservation measures will effectively achieve the biological goals and objectives. However, there
15 is some uncertainty associated with some AMMs and mitigation strategies, as well as with species
habitat locations and population estimates within the HCP planning area. Results of effectiveness
monitoring may also indicate that some AMMs or mitigation measures are more or less effective
than anticipated. Therefore, in addition to monitoring, the HCP includes an adaptive management
program designed to propose alternative or modified management measures in response to the
20 monitoring results.

The USFWS defines adaptive management as “a method for examining alternative strategies for
meeting measurable biological goals and objectives and then, if necessary, adjusting future
conservation management actions according to what is learned (65 Fed. Reg. 35252).” It is a tool
25 used to address uncertainty in the conservation of species included in an HCP. The foundation of an
adaptive management strategy is identifying the uncertainty to be addressed. The Five-Point Policy
also notes that:

[o]ften, a direct relationship exists between the level of biological uncertainty for a take
30 species and the degree of risk that an incidental take permit could pose for that species.
Therefore, the operating conservation program may need to be relatively cautious initially
and adjusted later based on new information, even though a cautious approach may limit the
number of alternative strategies that may be tested.

35 Although the adaptive management strategy anticipates future modifications to implementing the
conservation program, the strategy becomes part of the HCP's provisions and, therefore, is integral
to the proper implementation of the plan. As such, the adaptive management strategy is subject to
the USFWS “No Surprises” rule and assurances (discussed further in Chapter 8).

40 *7-Step Process of Adaptive Management*

Expanding on the framework (outlined in Section 6.1.3), adaptive management consists of a
repeating 7-step process:

- 45 1. *Assess the problem:* What are the potential impacts? What are the uncertainties or
assumptions about how the species, habitat, and groundwater will respond to impacts and
management actions? These issues are addressed in Chapter 5 of this HCP.
2. *Management design:* Explain how management is designed to address impacts and achieve
biological goals and objectives. These issues are addressed in Chapter 5 of this HCP.

3. *Implement management actions*: Describe how and when management actions will be implemented to achieve the desired outcomes. Describe how management intervention and follow-up monitoring will be used to improve management decisions. Explain how decisions will be guided by management objectives. These issues are addressed in Chapters 5 and 6 of this HCP.
4. *Monitor system and species response*: Explain how monitoring will be used to inform whether management actions need to be adjusted or changed. This issue is addressed in earlier sections of this chapter (Chapter 6). It is important to note that an HCP's monitoring program and adaptive management strategy are integrally linked. Monitoring should be able to indicate whether adaptive management needs to be implemented and, once adaptive management is used, the monitoring program should be able to adequately assess its effectiveness. The monitoring program is essential to determine whether the strategy is providing the desired outcome of achieving the biological goals and objectives of the HCP. Under this HCP, the analyses of Covered Species and their habitat and associated monitoring data will be used to identify if and where adaptive management actions should be implemented. Specifically, data from the monitoring program will be used to determine when adaptive management is necessary (e.g. through the use of a trigger) and to select the appropriate adaptive management strategy to implement. When an adaptive management action is implemented, the monitoring program will be used to evaluate the response of the Covered Species and/or impact to habitat and whether the action effectively addresses the concern identified. HMS' responsibilities for integrating the monitoring and adaptive management programs of this HCP include: (1) gathering monitoring data on the effectiveness of AMMs and mitigation and maintaining a database; (2) assessing results of AMM and mitigation monitoring to determine effects on Covered Species and habitats; (3) if effects are not what was anticipated, implementing, in coordination with the USFWS and IDNR, the necessary changes to the conservation program to ensure minimization and mitigation consistent with the USFWS permit issuance criteria; and (4) monitoring and evaluating the implementation and effectiveness of adaptive management strategies.
5. *Evaluate if biological goals and objectives are being met*: Explain how monitoring and other information (e.g. new biological information reported or published) will or may be used to evaluate if goals and objectives are being achieved. Monitoring (described in detail in earlier sections of this chapter and Appendix G of this HCP) coupled with adaptive management will provide the empirical data to assess if biological goals and objectives are being met.
6. *Adjust management*: How decisions will be made as to how or whether management needs to be adjusted. As discussed in earlier sections of this chapter), if monitoring results trigger adaptive management (e.g. a performance standard is not met) and/or biological goals and objectives are found not to be met, management will be adjusted in order to achieve performance standards and biological goals and objectives.
7. *Repeat*: How often will things be evaluated and how often might management actions need to be adjusted. Monitoring frequencies vary among different metrics, as do interventions such as adjusted management (see earlier sections of this chapter).

Applying and Implementing Adaptive Management

Not every area of uncertainty in an HCP is appropriate to address through adaptive management. Adaptive management is a process for considering alternative strategies for meeting biological goals and objectives and modifying future conservation strategies based on what is learned from monitoring and the implementation of the alternative strategies. Therefore, adaptive management is best suited to address uncertainty in the HCP's conservation framework. Accordingly, the HCP

focuses adaptive management on critical biological processes or conservation measures where uncertainty may influence the accuracy or prediction or effectiveness of proposed conservation measures.

5 If the monitoring results reveal that AMMs or mitigation are not performing as intended and not meeting the biological goals and objectives of the HCP, HMS will develop and implement strategies to improve the AMMs and/or mitigation efforts being implemented. Consistent with the cyclical design of adaptive management, should a change to AMMs or mitigation be triggered, further monitoring of that revised or new measure would be required to gauge its effectiveness. This will continue until the alternative achieves the desired effectiveness, or it is jointly determined with the USFWS and IDNR that the presumed response cannot be achieved. Whenever it is determined that the goal of an AMM or mitigation cannot be achieved, HMS will:

- 1) calculate additional take that has occurred, if any;
- 15 2) identify any mitigation required to compensate for that unanticipated take;
- 3) evaluate whether there is a need to further adjust the allowable level of take in the permit;
- 4) if necessary, amend the HCP and ITP in accordance with the terms of Chapter 9; and,
- 5) evaluate whether the taking still will not appreciably reduce the likelihood of the survival and recovery of the species in the wild, pursuant to 16 U.S.C §1539(a)(2)(B)(iv), 50 C.F.R. §§ 17.22(b)(2)(i)(D) and 17.32(b)(2)(i)(D).

In the event that a goal of an AMM or mitigation cannot be achieved, each of the above items will be addressed, at a minimum, through the annual report and feedback mechanisms identified in Section 6.3 below.

25 In any case where an AMM simply fails to provide the anticipated protection and there is evidence from effectiveness monitoring or other credible sources (e.g. the local USFWS Field Office) documenting failure that results in additional take, the HCP and, if necessary, the ITP may be amended in accordance with Chapter 9. Similarly, if there is evidence that the AMMs perform better than expected; the compensatory mitigation requirements may be reevaluated and reduced by the USFWS, if appropriate.

Adaptive Management of Groundwater AMMs

35 Adaptive management measures will be implemented if the prescribed avoidance measures at the River South Bluff Parcel and FPDWC pond are deemed insufficient in supplementing groundwater supplies or mining/dewatering impacts are greater than expected. The need for adaptive management measures will be assessed through an iterative process of the collection and evaluation of routine, verification and assessment monitoring data. These steps will encompass the adaptive management process as depicted in the monitoring flow charts (Figures 4-1 through 4-4) presented in Appendix G-1.

45 Different options for adaptive management measures have been preliminarily evaluated during the development of the preferred alternative. These measures have been conceptually and numerically evaluated as a pro-active approach in developing alternatives for avoiding potential groundwater impacts. The performance and operation of the avoidance measures will be monitored through inspections and monitoring. Field data will be reviewed to verify that avoidance measures are operating as planned. Changes to avoidance measures will be implemented (if possible) to mitigate

for the potential for changed conditions. These options will be revisited should monitoring data indicate that the avoidance measures may be insufficient and adjustment to the avoidance measures or supplement measures are needed. One example of an adaptive management strategy includes the adjustment of the amount of water conveyed to the infiltration galleries – whether more water is needed or whether the flow rates to each gallery need to be adjusted. The FPDWC Pond may also be evaluated for implementation of adaptive management changes, including adjustment of the spillway to maintain more water or increasing the frequency of sedimentation removal. Assessment monitoring will continue until a demonstration can be made that the adaptive measures have been successful.

Discussion of the groundwater monitoring procedures is included in this chapter and in more detail in Section 4.1 of the Groundwater Monitoring Plan provided in Appendix G-1. Adaptive management measures not specified in the Groundwater Monitoring Plan may be implemented if new information provided by monitoring data or other studies supports alternative measures and those alternative measures are reviewed and approved by USFWS.

The processes described in this section address species-specific adaptive management. This process is separate from the process for addressing responses to changed and/or unforeseen circumstances described in Chapter 8.

6.3 Reporting

6.3.1 Annual Report

Per 50 CFR 13.45, HMS will file an annual report with the USFWS and IDNR for the previous calendar year by March 1st. INPC, ACOE, and FPDWC will be notified that the report is available following each filing. Each annual report will include the following:

1. Brief summary or list of Covered Activities completed during the reporting year;
2. Annual and cumulative acreage of land disturbed;
3. Pre-construction documentation, when needed, of Covered Species;
4. AMMs implemented, including frequency, type, and description, if needed;
5. Summary of all Compliance Monitoring;
6. Summary of all Effectiveness Monitoring;
7. Summary of all Validation Monitoring;
8. An assessment of AMM implementation and any changes made to improve implementation of AMMs;
9. Annual and cumulative take level for each Covered Species;
10. List, description (with graphic representation, if needed), and quantification of mitigation activities, and their performance from the previous year;
11. Description of implemented adaptive management measures during the year and why they were needed;
12. A cumulative table of all adaptive management changes to the HCP (cumulative);
13. Description of any changed or unforeseen circumstances that occurred and how they were addressed;
14. Description of any minor or major amendments
15. Summary of meetings held with supporting partners and/or regulatory agencies; and

16. An estimate and description of the anticipated compensatory mitigation for the coming year, including any changes to the mitigation plan.
17. Funding expenditures, balance, and accrual

5 *Meetings: Feedback Mechanism and Implementation*

HMS, USFWS, IDNR, and other stakeholders as appropriate, will convene as needed during the first year of implementation of the HCP and at least annually until the end of the permit period, unless USFWS and IDNR determine that an annual meeting is not needed. HMS and USFWS representatives will have the joint responsibility of setting up the meeting and notifying the other required attendees. In addition to these set meetings, HMS, USFWS, and IDNR may convene stakeholder meetings as needed throughout the life of the permit. Such meetings may be in person or by conference call.

15 The purpose of these meetings will be: (1) to review the data provided in the annual reports; (2) to address any issues with implementation of the HCP; (3) to consider whether implementation can be streamlined; (4) to determine whether the avoidance, minimization, and mitigation measures have been effective and goals have been achieved, and whether any adaptive management is needed; and (5) to address other HCP-related concerns. There will be a summary report of these meetings (i.e. meeting minutes). This summary report will be prepared by HMS or its designated representative, but the USFWS and IDNR will be given the opportunity to review and concur with the report prior to its finalization and being made available to the public. This review cycle does not preclude the use of adaptive management in the interim if circumstances indicate changes are warranted.

25 *Maintaining Current Data for HCP Species*

USFWS and IDNR will inform HMS of any changes in the listing status of species covered under this HCP or if critical habitat has been designated within or adjacent to the HCP Planning Area. USFWS and IDNR also will inform HMS of any new or revised recovery plans or 5-year reviews for the Covered Species. USFWS and IDNR will provide annually, in writing: (1) updated lists of listed and candidate species within the HCP Planning Area, and (2) other information pertaining to Covered Species that specifically may inform the implementation of the HCP. USFWS, IDNR, and HMS will coordinate to determine whether any of the information warrants consideration in the adaptive management process or as a changed circumstance.

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7.0 FUNDING

5 HMS can assure USFWS and IDNR that adequate funding will be available to successfully implement its specific commitments under this HCP. HMS' assurances are consistent with the general information contained in this HCP.

10 To obtain an Incidental Take Permit under Section 10 of the Endangered Species Act and the corresponding Incidental Take Authorization under the Illinois Endangered Species Protection Act, HMS must provide adequate written assurance that it is committed to funding the avoidance measures, mitigation, monitoring, and reporting required for its specific HCP commitments over the life of its individual permit. HMS' history over the past 14 plus years of funding project development, including pre- and post-mining studies, demonstrates its capability and commitment to continue such funding. HMS will generate sufficient income each year through its routine operations over the 30 year life of the permit to ensure that all costs associated with funding the conservation plan will be covered and included in its annual budget.

7.1 HMS Funding Commitment

7.1.1 Introduction

20 HMS' funding commitment is designed to cover all aspects of the conservation program, including mitigation (e.g. habitat restoration), AMMs (e.g. infiltration gallery and turtle searches), maintenance for both mitigation and AMMs, monitoring (e.g. compliance and effectiveness), reporting, changed circumstances, and program administration and management.

7.1.2 Costs to implement HMS' Conservation Plan

25 The costs to implement the HCP will vary from year to year depending on the nature and extent of the covered activities undertaken. The HCP costs fall into five general categories.

30 The costs of the conservation program will include:

- Avoidance and minimization measures and mitigation
- Costs related to establishing a declaration of restrictions or a conservation easement
- Adaptive management
- 35 • Monitoring and reporting
- Changed circumstances, and
- Program administration and management

40 Each of these categories is discussed in more detail below.

7.1.2.1 Avoidance, Minimization, and Mitigation Costs

45 HMS' avoidance and minimization measures and mitigation activities include all aspects of the habitat restoration, installation and operation of infiltration galleries and infiltration pond, installation of silt fence and other measures to avoid take of covered turtles, other measures, and maintenance of all these measures. HMS will implement and fund the initial mitigation and AMMs prior to take of the covered species; therefore, no funding assurance will be required or provided for

these measures. Maintenance and monitoring costs during the permit period will be secured by a performance bond.

- The initial mitigation and habitat restoration, including the prairie transplant, will be completed by an ecological contractor and will cost HMS approximately \$3 Million. The initial mitigation will be implemented prior to a corresponding take of the covered species. This will consist of habitat restoration on a number of parcels and is expected to take place over the first three years of the project and prior to impacting the covered species' habitat. The prairie transplant will occur in approximately year 4 of the ITP and ITA and after the completion of the initial mitigation. Therefore, the funds for the initial mitigation and habitat restoration, including the prairie transplant, will not be assured. Once restoration is complete, maintenance will be required in all restored and enhanced areas for the duration of the HCP. Over the 30 year life of the permits, vegetation maintenance costs will be approximately \$2.5 Million, and performance of the work will be secured by a performance bond annually for the following year.
- Groundwater impact avoidance measures (i.e. River South Bluff infiltration galleries and FPDWC pond) will be designed and constructed by an environmental engineering firm and contractor, respectively. This work will cost HMS approximately \$3 million and they will be constructed prior to a corresponding take of the covered species. The tunnel under Route 53 which connects the Pierce-Eich Quarry to the Middle Quarry will be plugged after mining is completed in the Pierce-Eich Quarry (west of Route 53). The cost for this plug is approximately \$600,000. The infiltration gallery will continue to operate until the tunnel plug has been installed and the Pierce-Eich Quarry is holding water to restore the groundwater levels in and around River South parcel to baseline conditions. Therefore, the tunnel plug will not be secured with a performance bond since it is an avoidance measure that will replace a previously constructed avoidance measure. If the groundwater does not reach levels that allow the infiltration gallery to be decommissioned, then it will continue to operate.
- Other avoidance and mitigation measures, described in Sections 5.1.3 and 5.1.2, will be used by HMS as part of its Conservation Program. These AMMs also will be funded by the company and budgeted for on an annual basis as an operating expense.

7.1.2.2 Cost Related to Establishing a Declaration of Covenants, Conditions, and Restrictions or Conservation Easement

HMS commits to preserving nine parcels it owns and are part of its conservation program: River South, River South Bluff, Fitzpatrick Seep, River, North, Far North, River North, Long Run, and ComEd Parcels. In order to ensure the long-term preservation and maintenance of these properties, HMS will file a declaration of restrictions over these parcels within 30 days after all required permits for this project are received and any potential legal action is resolved. It is the intention of HMS that the declaration of restrictions (later to be converted to a conservation easement if a qualified entity can be found to hold it) on these parcels will be perpetual, thus outliving the life span of the HCP agreement. HMS will deposit \$120,000 in an interest-bearing account within 90 days of permit issuance that will be used to maintain the mitigation parcels after the permit is expired. The dollars in this account will be transferred to the holder of the conservation easement after it is impressed.

7.1.2.3 Adaptive Management

5 HMS is committed to utilizing adaptive management practices in order to ensure the long-term success of the project. Adaptive management refers to potentially needed changes to the HCP based on new information gathered over the course of implementing the HCP through monitoring, improved modeling, and/or new technology. Adaptive management may result in changing the way that AMMs are implemented; altering mitigation projects; or requiring other changes to the HCP. Any costs of adaptive management are, by their nature, impossible to estimate because they are dependent on future events and on information that will not be available until after project implementation and monitoring has occurred. If financial assurances are determined to be needed to initiate adaptive management, the appropriate financial assurances will be provided.

7.1.2.4 Monitoring

15 The monitoring program, including reporting requirements, is described in Chapter 6 and Appendix G. Monitoring will be required for many aspects of both the mining plan and the conservation program. Monitoring associated with groundwater, vegetation and the HED will be ongoing throughout the life of the permit and a performance bond will be obtained on an annual basis to secure the work planned for the following year.

7.1.2.5 Changed Circumstances

25 Changed circumstances refer to external, future circumstances that could impact the HCP's operating conservation program and can be reasonably anticipated and planned for. Such changed circumstances could include climate change, tornados, flood, drought, fire, oil spill, etc. For a more detailed discussion of changed circumstances, see Chapter 8.

30 Reasonably foreseeable circumstances described in Chapter 8 could prompt the need to restore or replace one or more mitigation projects. Due to the uncertainty surrounding future impacts from changed circumstances and effective measures to rectify them, HMS estimates approximately \$100,000 to perform this work and it will be guaranteed through a performance bond. This will provide the appropriate assurances that funds will be in place for future restoration actions directly related to degradation of mitigation land from changed circumstances. The costs associated with changed circumstances are difficult to predict because they are dependent on unknown future events. Although it is reasonably foreseeable that some changed circumstances will occur over the life of the ITP, it is very unlikely that multiple changed circumstance events would occur that would result in mitigation failure. Application of changed circumstances funds toward corrective measures will occur when a changed circumstance is triggered. Should changed circumstances result in the need for HMS to expend additional funds than those estimated here, HMS will increase the performance bond commensurate with the costs for such actions as determined at that time.

7.1.2.6 Administrative and Management Costs

45 The administrative costs associated with this HCP include program management and oversight, training, data management, reporting and software costs. The administrative and management costs will be budgeted by the company as an annual operating expense.

7.1.3 Funding Assurances

5 HMS can demonstrate its ability to adequately fund its HCP program as required by the USFWS' implementing regulations. HMS has chosen several mechanisms to cover its various financial obligations under the HCP.

To summarize;

- 10 1. Mitigation/habitat restoration will be implemented prior to take of the covered species and costs associated with this work will be funded by the company and no financial assurances will be provided.
2. The costs for the infiltration galleries and pond will be funded by the company and no financial assurances will be provided because they will be installed before take occurs.
- 15 3. The costs associated with the plugging of the Route 53 tunnel will be funded by the company and no financial assurances will be provided. Once Pierce Eich Quarry is inundated it will replace the need for the infiltration galleries and pond avoidance measures.
4. Monitoring associated with groundwater, vegetation and the Hine's emerald dragonfly will be ongoing throughout the life of the permit and will be funded by the company. This work will be secured by a performance bond that will be obtained on an annual basis for the work
20 planned for the following year.
5. The costs associated with the vegetation maintenance over the 30 year life of the ITP and ITA will be approximately \$2.5 Million, and company funding will be provided annually for the following year and guaranteed through a performance bond.
- 25 6. The costs associated with the Administrative and Management activities will be funded by the company as an annual operating expense.

8.0 CHANGED and UNFORESEEN CIRCUMSTANCES

8.1 Introduction

5 HMS recognizes that circumstances can change during the term of an HCP. Those altered
circumstances, some due to natural events or factors outside the control of HMS, could merit
changes in the implementation of this HCP’s mitigation plans and conservation package. This
chapter defines those “changed circumstances” that HMS reasonably anticipates and can plan for,
as well as the “triggers” for HMS’ responses to those changed circumstances to address the possible
10 effects on a Covered Species or habitat. This chapter also discusses “unforeseen circumstances; that
is, changes in circumstances which could not reasonably have been anticipated by HMS and
USFWS at the time of developing this HCP.

8.1.1 Federal “No Surprises” Assurances

15 The Federal “No Surprises Rule,” 63 Fed. Reg. 8859 (Feb. 23, 1998) (codified at 50 C.F.R. §§ 17.3,
17.22(b), and 17.32(b)) assures HMS that as long as the company is properly implementing its HCP
and the Incidental Take Permit, no additional commitment of land, water, or financial compensation
will be required, and no restrictions on the use of land, water, or other natural resources will be
20 imposed beyond those specified in the HCP without HMS’ consent. The No Surprises rule was
developed to provide Incidental Take Permit applicants with long-term economic and regulatory
certainty. The “No Surprises” rule has two major components: changed circumstances and
unforeseen circumstances.²

8.1.2 Changed Circumstances

25 The term “changed circumstances” is defined under the regulations promulgated pursuant to the
Endangered Species Act, as follows:

30 Changed Circumstances means changes in circumstances affecting a species or geographic
area covered by a conservation plan that can reasonably be anticipated by plan developers
and the USFWS, and that can be planned for (e.g. the listing of a new species, or a fire or
other natural catastrophic event in areas prone to such events) (50 C.F.R. §§ 17.3).

35 If additional conservation and mitigation measures are deemed necessary to respond to changed
circumstances and are provided for in the HCP, HMS will be expected to implement such measures.
If additional conservation and mitigation measures are deemed necessary to respond to changed
circumstances and such measures *were not* provided for in the HCP, USFWS will not require any
additional measures beyond those provided for in the HCP, without the consent of HMS, provided
40 the HCP is being properly implemented. “Properly implemented” means that the commitments and
the provisions of the HCP and permit have been or are being fully implemented by HMS (50 C.F.R.
§ 17.3).

² The Illinois Endangered Species Protection Act (520 ILCS 10/), also requires applicants to describe steps they will take to minimize and mitigate impacts, including, under the implementing regulations, “adaptive management practices that will be used to deal with changed or unforeseen circumstances...” (17 IAC 1080.10(a)(2)(E)). Please see Appendix I. The adaptive management practices described in this chapter will include notification to the Illinois Department of Natural Resources, whenever necessary.

Changed Circumstances and Mitigation Success Criteria

Specific management objectives and desired outcomes have been developed as part of this HCP's mitigation and conservation plan, primarily represented by HMS' stated success criteria (e.g. performance standards). By monitoring and evaluating the Covered Species' habitat and/or habitat components as described in the HCP, HMS can determine whether the HCP's mitigation and conservation plan are meeting their intended objectives. Once the objectives and outcomes have been accomplished, HMS will have fully mitigated for any "take" associated with the HCP activities.

5
10 HMS has tried to anticipate the impact of its permitted activities, as well as the minimization, mitigation (i.e. restoration, recovery actions, protection, and management measures), and monitoring measures which will be necessary to conserve the Covered Species and their habitats. In addition, HMS has provided for flexible expenditure of mitigation funds and the implementation of mitigation measures (i.e. incorporation of adaptive management) to meet and address future
15 uncertainties. As described in Chapter 6, adaptive management is an iterative process that includes 1) gathering data through monitoring, 2) assessing monitoring results and effects on Covered Species, 3) implementing in coordination with USFWS and IDNR, if needed, changes to the conservation program (including planned response to changed circumstances), and 4) monitoring and evaluating the effectiveness of the adaptive management strategies. Using this approach, HMS
20 is planning for the potential impacts of changed circumstances and intends to reduce the potential adverse impacts of such changed circumstances on the Covered Species and their habitats to the extent possible, as described below.

8.1.3 Unforeseen Circumstances

25 The term "unforeseen circumstances" is defined under the regulations promulgated by the Endangered Species Act as follows:

30 Unforeseen circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species (50 C.F.R. §§ 17.3).

35 The USFWS bears the burden of demonstrating that unforeseen circumstances exist, using the best available scientific and commercial data available (50 C.F.R. §17.22(b)(5)(iii)(C)).

40 If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, USFWS may require additional measures of HMS where the HCP is being properly implemented only if such measures are limited to modifications within conserved habitat areas, if any, or to the HCP's operating conservation program for the affected species, and maintain the original terms of the plan to the maximum extent possible (50 C.F.R. §§ 17.22(b)(5)(iii)(B) and 17.32(b)(5)(iii)(B)). Additional conservation and mitigation measures will not involve the
45 commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan without the consent of the permittee (HMS) (50 C.F.R. §§ 17.22(b)(5)(iii)(A)).

Of course, notwithstanding these assurances, nothing in the “No Surprises” rule will be construed to limit or constrain USFWS, any other Federal agency, or a private entity, from taking additional actions, at its own expense, to protect or conserve a species included in a conservation plan (50 C.F.R. §§ 17.22(b)(6) and 17.32(b)(6)).

5

8.2 Changed Circumstances Addressed in this HCP

HMS is requesting regulatory assurances under the “No Surprises” rule for the federally listed HED, Blanding’s turtle and spotted turtle. HMS will be responsible for implementing remedial measures in response to those changed circumstances addressed in this chapter. If a changed circumstance occurs within the HCP planning area, USFWS and HMS will coordinate and determine if additional conservation and mitigation measures are necessary. In such an event, USFWS may determine that additional measures are necessary. Again, as stated above, pursuant to the “No Surprises” rule and regulations, if such measures are addressed in this HCP, HMS will implement them. If additional measures are deemed necessary to respond to a changed circumstance and such measures *are not* provided for in this HCP, USFWS will not require any additional conservation or mitigation measures without the consent of HMS, as long as this HCP is being properly implemented.

20 The following circumstances are reasonably anticipated by HMS and are therefore addressed in this chapter:

1. Climate change (in the Chicago area)
2. Change in listing status of species in the HCP area
- 25 3. Change in habitat range or newly identified species
4. Fire
5. Drought
6. Severe wind/tornados
7. Invasion of a new plant species
- 30 8. Invasion of a new non-plant species
9. Changes in surface or groundwater hydrology, including flood
10. Accidental harmful human activity
11. Vandalism or illegal human activity
12. Disease
- 35 13. Oil spill or natural gas leaks
14. Train derailment

8.2.1 Climate Change in the Chicago Area

40 *Description*

Global climate change has affected and will continue to affect the climate of the Chicago area. Average annual temperatures in the region have increased by 2.6°F (1.44°C) since 1980, and are expected to increase further in future decades, according to the Chicago Climate Action Plan (CCAP 2008). Models predict that Chicago’s annual average temperature is likely to increase 1-45 1.5°F (0.56-0.83°C) over the next few decades and to increase by 3-8°F (1.66-4.44°C) by the end of the century (depending on the level of greenhouse gas emissions) (CCAP 2008). With these increases, Chicago’s summer climate could be similar to that of Springfield, IL, within a couple decades and like that of Knoxville, TN, or possibly Houston, TX, depending on the level of

greenhouse gas emissions, by the end of the century. The possible effect of these changes on the Covered Species and changed circumstances are discussed below.

Effect on Species and Habitats/Ecosystems

5 This increase in temperature will affect local species and the ecosystems on which they depend (CCAP 2008). Based on their ability to tolerate the increased temperatures and other related changes in habitat, some species will decline in abundance in the region while others will increase. In addition, some species (from warmer areas) will move into the region while others will move, likely north, out of the region. Locally declining species that cannot disperse or migrate out of the
10 region will decrease in population size or possibly die out. Changes in species composition, especially plants, in local ecosystems will alter habitats and will likely contribute to further changes in animal composition. Climate change is also likely to alter the timing of both plant and animal processes (e.g. flower bloom times and bird migration time), which could alter biological interactions in current ecosystems. Due to the rapid rate of change and barriers to movement from
15 habitat loss and fragmentation, modern climate change is anticipated to result in a loss of biodiversity.

Changed and Unforeseen Circumstances

20 The CCAP report uses projections based on climate change models from the Intergovernmental Panel on Climate Change (IPCC) to predict likely temperature increase in the future under both a low greenhouse gas emissions and high greenhouse gas emissions (worst case) scenario. According to IPCC models (using both emissions scenarios), the Chicago region annual average temperature is predicted to increase 1.8-3.6°F (1-2°C) by 2039 and 2.7-9°F (1.5-5°C) by 2069.

Effect of Climate Change on Other Changed Circumstances

25 Climate change will include not only an increase in temperature but also will include changes in weather patterns (CCAP 2008). Such weather pattern changes may cause many of the other changed circumstances examined in this section. A summary of these possible effects is provided below.

30 Summers are expected to become hotter and drier (due to a similar amount of rain but with more evaporation). Therefore, unplanned fires may become more frequent and their intensities could be greater. Warmer temperatures could allow new invasive species from warmer climates (e.g. Kudzu) to move into the area; some existing invasive species in the region may favor warmer temperatures. Diseases and insect pests are also more prevalent in warmer climates, and plants and animals
35 stressed by increased temperatures will be more susceptible to disease. Further, increased flooding (as discussed below) will also promote disease.

Average rainfall is expected to increase (20% by the end of the century) but most of it will be in the winter and spring. Rain also is predicted to occur in fewer and larger events which may result in
40 more surface runoff. These changes in rain patterns are predicted to increase flooding, especially in the spring. However, droughts are predicted to increase due to increased average summer temperature with no increase in summer rainfall. In addition, lake levels are predicted to decline due to increased evaporation. These changes could reduce groundwater recharge, if the increase in total annual rainfall does not offset the reduction in infiltration due to increased runoff and evaporation.
45 In addition, increased air temperatures can be expected to increase surface- and groundwater temperatures.

Weather pattern changes resulting from climate change may produce more storms with high winds or tornados. Tornado records provide evidence that this may be occurring. The frequency of

reported tornados in the US has increased over the past fifty years, and 2011 was one of the most active years for tornados since modern record keeping began in 1950 (NOAA 2011). However, the frequency of strong tornados (F3-F5) over this same time period does not show this same (i.e. increasing) trend (NOAA 2012). If this increasing tornado frequency is real and continues, more
5 tornadoes and wind storms may be expected in the Chicago area in the future. The CCAP report does not discuss wind or tornadoes, perhaps because they operate at a much smaller scale than changes in climate. According to the National Science and Technology Council's *Scientific Assessment on Climate Change* (NSTC 2008), "[t]rends in other extreme weather events that occur
10 at small spatial scales--such as tornadoes, hail, lightning, and dust storms--cannot be determined at the present time due to insufficient evidence." This is because tornadoes are short-fused *weather*, on the time scale of seconds and minutes, and a space scale of fractions of a mile across. In contrast, *climate* trends take many years, decades, or millennia to develop, spanning vast areas of the globe.

Climate change also increases the chance of a change in a species' range and its population size. In
15 general, ranges are expected to shift north. This could result in a listed species leaving the area or another entering. In addition, the populations of a number of species in the area may decline because of loss of habitat, inability to migrate, and stress from increased temperatures. If the decline is great enough, it could result in those species becoming listed as threatened or endangered.

20 *Increased Temperatures Adverse Effects on HED*

The current range of the HED extends from southern Missouri to northern Michigan. Therefore, the species (and its appropriate habitat) does exist in a warmer climate than currently found in northern Illinois. Chicago's climate is predicted to be as warm as the current climate of southern Missouri
25 under the worst-case scenario (high emissions model) in about 50 years (after the end of the permit). Therefore, the HED is predicted to be able to tolerate the elevated temperature predicted for the Chicago area (even under the high emissions scenario) during the life of the permit. The HED, however, may change the time of its active period in response to warmer temperatures.

30 Trigger: A decline in the HED population within the HCP area of 40% to 59% from baseline accompanied by a 3.6°F (2°C) to 7.1°F increase in the annual temperature over baseline (permit year temperature) will be considered a changed circumstance triggering a response from HMS. Changes in both population and temperature will be based on a five-year running average. An increase of 7.2°F (4°C) or greater or a decline in population by 60% or greater will be considered an unforeseen
35 circumstance.

Response: HMS will inform USFWS and IDNR when its monitoring detects a decline in the HED population within the HCP Planning Area of 40% or more from baseline accompanied with a 3.6°F (2°C) increase in the annual temperature over baseline (permit year temperature). If this occurs
40 HMS will implement one or both of the following corrective actions:

- (1) Implement additional work or operational changes at or near mitigation site(s) in coordination with USFWS to improve habitat conditions and to address the source of potential negative impacts in areas with declining populations.
- 45 (2) Work with USFWS to place the affected population into a captive facility for its maintenance until a suitable site for reintroduction into the wild becomes available.

Trigger: A one week (7 days) to three week and six day (27 days) change in the timing of the first adult emergence, based on results of monitoring conducted by HMS or other stakeholders in the
HMS HCP

HCP area (e.g. FPDWC or IDNR) accompanied by a measured 3.6°F (2°C) to 7.1°F increase in the annual temperature over baseline (permit year temperature) will be considered a changed circumstance. Changes in both emergence date and temperature would be based on a five-year running average. HMS will start to monitor for emergence time after a 2.7°F (1.5°C) temperature increase is detected (using a five-year running average) and will use currently known (based on previously collected data or expert opinion) emergence time for the Illinois populations as a baseline. A change in emergence of greater than four weeks or an increase in temperature of 7.2°F (4°C) or more will be considered an unforeseen circumstance.

Response: HMS will inform USFWS and IDNR when an identified change in the time of the HED's active period (i.e. 7 to 27 days) in the Planning Area has occurred accompanied by a measured 3.6°F (2°C) to 7.1°F increase in the annual temperature over baseline (permit year temperature). If this occurs, HMS will adjust the timing of operations to accommodate changes in the HED's active periods. HMS will also participate in population salvage and captive rearing efforts on its properties. Corrective action will be implemented after notification of and consultation with USFWS. HMS may, but will not be required to, assist with other measures initiated by USFWS or IDNR to address this changed or unforeseen circumstance.

Increased Temperatures' Adverse Effects on Blanding's and Spotted Turtle

Blanding's turtle (BT) and spotted turtle (ST) in the HCP area are in the southern portion of their ranges, indicating that they may have limited tolerance for increased temperatures. As temperatures increase appropriate habitat will remain in the HCP area, because the plant communities that provide habitat (e.g. marsh) are found further south, but the turtles may experience increased physiological stress. Reptiles are sensitive to changes in air and water temperature (Carey and Alexander 2003). This is, in part, because reptiles are ectothermic, and temperatures outside of their thermal optima cause stress. In addition, turtles may change their active period in response to increased temperatures. Due to their substantially larger size, Blanding's and Spotted turtles should be less temperature-sensitive than the HED. However, because both turtles are at the southern end of their range of the Midwest/Great Lakes populations, they may be more sensitive to temperature change. Also, it is known that temperature affects the sex ratio of their eggs (Harding 1997 and Ewert and Nelson 1991). Therefore, the same temperature triggers will be used for the Covered Turtles as are used for the HED.

Trigger: A documented 3.6°F (2°C) to 7.1°F increase in the annual temperature (based on a five-year running average) will be considered a changed circumstance. An increase of 7.2°F (4°C) or greater will be considered an unforeseen circumstance.

Response: HMS will inform USFWS and IDNR when it documents a measured 3.6°F (2°C) to 7.1°F increase in the annual temperature over baseline (permit year temperature). If this occurs, HMS will coordinate with USFWS and IDNR to adapt management and other activities as needed.

Trigger: A two-week (14 day) change in the date of first emergence of BT or ST (based on a three-year running average) is detected accompanied by a 3.6°F (2°C) to 7.1°F increase in the annual temperature (based on a five-year running average) will be considered a changed circumstance. HMS will start monitoring emergence of turtles after a temperature increase of 2.7°F (1.5°C) is detected (based on a five-year running average). First emergence now is typically early March to early April with a wide variation year to year depending on weather. Currently known (based on previously collected data or expert opinion) emergence time for the lower Des Plaines River valley population will be used as a baseline. A four-week (28 day) or greater change in the date of first

emergence of BT or ST or an increase of 7.2°F (4°C) or greater will be considered an unforeseen circumstance.

5 Response: HMS will inform USFWS and IDNR when it documents that a change of 14 days in Blanding’s turtle or spotted turtle emergence date has occurred in the Planning Area accompanied by a 3.6°F (2°C) temperature increase. If this occurs, HMS will coordinate with USFWS and IDNR on remedial actions or adaptive measures that will be implemented, including:

10 (1) Implement additional work or operational changes at or near activity and mitigation site(s) that provide BT or ST habitat in coordination with USFWS and IDNR to improve habitat conditions and address the source of potential negative impacts in these areas.

15 (2) Work with USFWS and IDNR to develop and implement a capture and relocation plan that may involve moving turtles to more suitable habitat locations (i.e. with lower temperatures) north of the HCP area.

8.2.2 Change in the Listing Status of a Species in the HCP Permit Area

HCP Species Description

20 This section addresses state or federal listing of currently unlisted species that are “adequately covered” (as defined in 50 CFR 17.3) in the HCP subsequent to issuance of the requested permit. “Adequately covered” means, with respect to unlisted species, that a proposed conservation plan has satisfied the permit issuance criteria under section 10(a)(2)(B) of the ESA that would otherwise apply if the unlisted species covered by the plan were actually listed. For the USFWS to cover a
25 species under a conservation plan, it must be listed on the section 10(a)(1)(B) permit.

Listing of an unlisted species that is “adequately covered” (as defined in 50 CFR 17.3) in the HCP subsequent to issuance of the requested permit will be considered a changed circumstance.

30 Trigger: Listing of a currently unlisted species as federally endangered or threatened under the ESA that is “adequately covered” (as defined in 50 CFR 17.3) in the HCP subsequent to issuance of the requested permit.

35 Response: If an unlisted species that is “adequately covered” in the HCP is listed subsequent to issuance of the requested permit, no further conservation measures or other action will be required. The federal permit will afford protection against take liability for such species under Section 9 of the ESA and that species will be listed under the permit/authorization. HMS has requested that the Blanding’s turtle and spotted turtle be named on the requested permit because both have been
40 proposed for federal listing. This HCP contains adequate coverage for those species if they become federally listed provided HMS is properly implementing the HCP and permitting conditions. Both the Blanding’s and spotted turtle are currently state-listed and, again, will be adequately covered by this HCP.

Non-HCP Species

45 Listing of a currently unlisted species that is neither addressed in the HCP nor “adequately covered” (50 CFR 17.3) by the HCP will require an amendment to the HCP and a permit application if HMS’ otherwise legal activities are causing a take of the previously unlisted species.

Species Delisting Description

Delisting of an HCP-Covered Species during the term of the ITP.

Delisting of an HCP-Covered Species by the USFWS and/or IDNR during the term of the ITP will be considered a changed circumstance.

5

Trigger: Delisting of an HCP-Covered Species by the USFWS and/ or IDNR during the term of the ITP.

10 Response: Upon receipt of written notification from USFWS or IDNR of delisting of an HCP-Covered Species during the term of the ITP, HMS, IDNR, and USFWS will confer on a case-by-case basis to determine how such delisting of an HCP Covered Species will be addressed thereafter under the HCP, ITP, and ITA. HMS will continue all conservation measures specific to any delisted HCP-Covered Species until such discussions are complete. For those species which HMS' conservation activities may contribute to the recovery of the species, HMS will complete its
15 ongoing mitigation projects. HMS may participate with USFWS and IDNR in a five-year post-delisting monitoring plan.

8.2.3 Change in Habitat Range

20 *Description*

Identification of an HCP-Covered Species, including “adequately covered” species (as defined in 50 CFR 17.3), in new locations or habitat in the Planning Area will be considered a changed circumstance.

25 Trigger: Identification of an HCP-Covered Species, including “adequately covered” species (as defined in 50 CFR 17.3), in new locations or habitat based on results of documented scientific research or academic study performed by consultants to HMS or others in the Planning Area (e.g. FPDWC, HMS, or IDOT). USFWS and IDNR, who are responsible for monitoring federal and state species listings, will notify HMS in writing of the change and provide documented scientific
30 research data and other information regarding a change in the habitat range of an HCP Covered Species or “adequately covered” species found within the HCP Planning Area (as defined in 50 CFR 17.3). HMS will submit monitoring results to the USFWS and IDNR as required in Chapter 6 of this HCP and will point out any results that indicate new habitat locations for the HCP Covered Species and adequately covered species. For the purpose of this trigger, new locations include
35 newly discovered occurrences or habitats, as well as historical occurrences that are later shown to be extant or reoccupied. It may also include newly discovered occurrences or habitat outside the Planning Area, but only to the extent that their proximity indicates species presence or habitat suitability on lands within the Planning Area.

40 Response: Upon written notification from the USFWS or IDNR of the documented scientific research data, HMS will implement AMMs to avoid and minimize adverse effects and “take” of new occurrences of habitat. To the extent that “take” cannot be avoided, HMS will mitigate for the impact of any “take” consistent with Chapter 5. If it is determined that the amount of authorized “take” may be exceeded and that the impacts to the species will be greater than anticipated, HMS
45 will enter into discussions with USFWS and IDNR about how to minimize take in order to keep it below what is allowed by the permit.

8.2.4 Fire

Description

5 Fires have occurred historically in the Chicago region and have shaped and sustained the natural ecosystems of the area (Chicago Region Biodiversity Council, 1999). Historically, these fires were started by lightning strikes or Native Americans. Suppression of fires started after European settlement. More recently, however, the importance of fire for maintaining natural communities has been recognized, and today prescribed burning is one of the most important techniques used to manage these areas. Natural fires (i.e. lightning started) are very rare today, however, it is possible that natural fires may become more frequent in the Chicago area with hotter and drier summers as a result of climate change. According to Dave Robson, Natural Areas Manager for the Forest Preserve District of Will County (FPDWC), they experience an unplanned fire (mostly unintended arson) on their properties along the lower Des Plaines River about once every 3-4 years. However, no unintentional or unplanned fires have occurred on HMS-owned property at its Romeoville facility. HMS has owned ComEd/Long Run Parcels since 1998 and the rest of the Romeoville facility properties for over 70 years. The lack of unintended fires is likely due to the fact that HMS, unlike the FPDWC, does not allow public access to its properties. Thus, any (the first) unplanned fire on HMS property would be a changed circumstance. Any additional fires would constitute unforeseen circumstances.

Changed vs. Unforeseen Circumstances – Unplanned fires greater than 0.1 acres

20 Prescribed burning will be used in mitigation efforts as a restoration and management tool. The first unplanned fire greater than 0.1 acre in size within any mitigation sites in the HCP area will be considered a changed circumstance.

25 Any additional unplanned fires greater than 0.1 acre within any mitigation sites in the HCP area will be considered an unforeseen circumstance. Also, all accidental fires (greater than 0.1 acres) and all arson events (regardless of size) on HMS property in the HCP Permit Area will be reported to local authorities, IDNR and USFWS.

Fire's Adverse Effects on HED Mitigation Sites

30 Prescribed burning will be used as a restoration and management tool on mitigation sites. Such burning will be conducted in accordance with the restoration and management plan found in the mitigation section of the HCP (Chapter 5) and Restoration Plan Set (Appendix F) and will benefit the HED by improving the conditions of the habitat. A fire could potentially harm the HED if it is conducted during the adult flight season (i.e. mid-May to mid-October). Prescribed burns are not conducted during this time; thus, a fire during this time of year would be unplanned. Natural fires and unplanned human-caused (e.g. arson) fires are very rare on HMS properties but could become more common in the Chicago area as summers become hotter and drier as a result of climate change.

40 Trigger: An unplanned fire (natural or human-caused) greater than 0.1 acre in size occurs in a mitigation parcel owned by HMS.

45 Response: In response to the trigger, HMS will do the following: 1) assess the extent and impact of the fire, including the potential for direct harm to the HED; 2) identify and implement additional measures to prevent unplanned fires in the future; and 3) adjust future plans or other aspects of mitigation in the affected area, as needed, to protect the HED and enhance its habitat. In addition, if operational equipment and structures are damaged, HMS will contact USFWS and IDNR about

needed repairs and will start repairs after consulting with USFWS and IDNR. HMS will report to USFWS and IDNR any actions taken. Also, all accidental fires (greater than 0.1 acres) and all arson events (regardless of size) on HMS property in the HCP Permit Area will be reported to local authorities, IDNR, and USFWS.

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Fire's Adverse Effects on Blanding's and Spotted Turtle Mitigation Sites

Prescribed burning will be used as a restoration and management tool on mitigation sites.

Such burning will be conducted in accordance with restoration and management plans found in the mitigation section of the HCP (Chapter 5) and will benefit BT and ST by improving the condition of habitat. A fire potentially could harm BT and ST if it is conducted during their active season (i.e. 10 March 16 to October 31). Prescribed burns may be conducted during this time (e.g. after March 15) only under the conditions specified by USFWS in its Section 7 review of HED habitat management and restoration (USFWS 2014b). Natural and unplanned human-caused (e.g. arson) fires are very 15 rare on HMS properties but could become more common in the Chicago area as summers become hotter and drier as a result of climate change.

Trigger: An unplanned fire (natural or human caused) greater than 0.1 acre in size occurs in a mitigation parcel owned by HMS.

20 Response: In response to the trigger, HMS will do the following: 1) assess the extent and impact of the fire, including the potential for direct harm to the BT and ST; 2) identify and implement additional measures to prevent unplanned fires in the future; and 3) adjust future burn plans or other aspects of mitigation in the affected area, as needed, to protect the Blanding's and spotted turtle and enhance its habitat. In addition, if operational equipment and structures are damaged, HMS will 25 contact USFWS and IDNR about needed repairs and will start repairs after consulting with USFWS and IDNR. HMS will report to USFWS and IDNR any actions taken. Also, all accidental fires (greater than 0.1 acres) and all arson events (regardless of size) on HMS property in the HCP Permit Area will be reported to local authorities, IDNR, and USFWS.

30 **8.2.5 Drought**

Description

Drought is a normal and recurring temporary feature of Illinois' climate. While drought is generally recognized as a deficiency of precipitation that results in a water shortage over an extended period 35 of time, specific definitions vary based on the activities or groups affected. Drought definitions are dependent on environmental, social, and economic factors (State Water Plan Task Force 2011). From an environmental perspective, the definition of drought typically considers the relationship of precipitation to factors such as air temperature, soil type, and geologic characteristics (Changnon 1987). According to the Illinois State Water Survey, Illinois has experienced five severe droughts 40 (1980-1981, 1988-1989, 1999-2000, 2005, and 2007) since the mid-1950s that have negatively impacted the state's economy and natural resources (ISWS 2011). This frequency is consistent with Changnon et al. (1996) which states that droughts have occurred in approximately ten percent of all years in the past century in Illinois. Climate change is expected to result in increased evaporation in the Midwest during summer due to increased average air temperatures and longer periods between 45 rainfalls. This is expected to lead to more frequent periods of drought throughout the region (USGCRP 2009).

For this HCP, the Palmer Drought Severity Index (PDSI) will be used for recognizing drought and planning response measures. The PDSI is a mathematical index that is calculated based on
HMS HCP

precipitation and temperature data and has proven to be a useful monitoring tool to trigger drought contingency plans (State Water Plan Task Force 2011). Drought values on the PDSI range from zero through negative four with the following classifications: 0 = normal conditions, -1 = mild drought, -2 = moderate drought, -3 = severe drought, and -4 = extreme drought (Palmer 1965). This HCP assumes that a PDSI score of negative three or negative four may interfere with and affect the normal life cycles of the Covered Species.

Changed Circumstance vs. Unforeseen Circumstance

Periodic droughts are characteristic of the climate in Illinois, and HMS has planned for the possibility of droughts occurring during the 30-year permit duration. Based on the historic occurrence of droughts during 26% of the years since 1980 (8 years in a 31-year span (1980-2011)) in Illinois, changed circumstances will be deemed to have occurred after more than seven drought years (i.e. 8 or 9 drought years) are experienced during the permit period. If more than nine drought years occur during the permit period, then that will be considered an unforeseen circumstance. A drought of three years duration will also be considered a changed circumstance, as no drought occurring since 1980 in Illinois has lasted more than two years. A drought lasting more than three years will be considered an unforeseen circumstance.

Hine's Emerald Dragonfly

Natural hydrologic cycles, including dry periods, may be an important part of the larval ecology of the HED. HED larvae gain a competitive advantage over the larvae of other dragonfly species during seasonal dry periods in streamlets by utilizing crawfish burrows that are deeper in the water table. However, USFWS identifies environmental extremes, including drought, as a threat to the species in the USFWS HED Recovery Plan. Severe drought may disrupt ecological and hydrological processes in marshes and sedge meadows and dry out the slowly flowing water sources, from shallow streams to groundwater seeps, for longer than HED larvae can persist in crawfish burrows. Drought also may alter the quality or pH of water in HED habitat, both of which are thought to be important to HED recruitment since the larvae are aquatic for three to five years (USFWS 2013).

Trigger: A PDSI score of negative three or less is documented within the HCP Planning Area by recognized experts/agencies at a frequency that is described above as a changed circumstance, as well as the survival of less than 70% aerial coverage (i.e. 30% loss) of restored HED habitat protected as part of the mitigation plan (Chapter 5) and a reduction in the HED population by 40% or more from baseline (based on a five-year running average) within the HCP Planning area.

Responses: HMS will inform USFWS and IDNR when it documents a PDSI score of negative three or less for the HCP Planning Area at a frequency that is described above as a changed circumstance and the survival of less than 70% aerial coverage of restored HED habitat and reduction in HED population of 40% or more from baseline within the HCP Planning Area. HMS will take one of the following actions: (1) work to re-establish HED habitat (e.g. vegetation and/or hydrology) at the original mitigation site, or (2) establish the original level of mitigation at a new mitigation site. HMS will monitor HED populations on its property to document any population change due to drought.

Blanding's Turtle and Spotted Turtle

Habitat available to BT and ST may shrink with diminishing surface water and wetlands during periods of drought which are severe enough to reduce water levels in these habitats. Lower water levels may increase distance between wetland habitats and suitable upland nesting habitat,

potentially reducing reproductive success. Drought may also result in reduced water quality in these habitats, which may pose a threat to the species (Lee 1999).

5 Trigger: A PDSI score of negative three or less is documented within the HCP Planning Area by recognized experts/agencies for the area at a frequency that is described above as a changed circumstance, as well as the survival of less than 60% aerial coverage (i.e. 40% loss) and 30% or greater change (increase) in wetland indicator status of restored BT and ST habitat protected as part of the mitigation plan (Chapter 5).

10 Responses: HMS will inform the USFWS and IDNR when it obtains documentation of a PDSI score of negative three or less in the HCP Planning area at a frequency that is described above as a changed circumstance and the survival of less than 60% aerial coverage and 30% or more increase in the wetland indicator status of restored BT and ST habitat. If this occurs, HMS will take one of the following actions: (1) re-establish aquatic and/or emergent vegetation at the original mitigation site, or (2) establish the original level of mitigation in a new mitigation site.
15

8.2.6 Severe Wind/Tornadoes

Description

20 While tornadoes are known to occur throughout the region, the likelihood that any particular place will be struck by a tornado is low. One measure of tornado frequency is the annual average number of tornadoes per 10,000 square miles by state. In Illinois, the annual average number of tornadoes per 10,000 square miles is 9.7 (average determined from time period of 1991 to 2010). On average in the U.S., the frequency that any particular square mile of land may be hit by a tornado is about
25 every thousand years (NOAA 2012).

Changed vs. Unforeseen Circumstances

When a tornado occurs and damages or destroys a minimization and/or mitigation effort covered by the HCP, HMS will implement conservation measures appropriate to remediate the circumstance.
30 This would include an evaluation of the affected site, implementing corrective action, and implementing additional monitoring (if appropriate).

HMS will consult the U.S. Weather Service to determine the Enhanced Fujito Scale classification of the severe wind/tornado event to determine if the occurrence is a changed or unforeseen
35 circumstance. The Enhanced Fujito Scale is a method to assess tornado damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators (Wind Science and Engineering Center 2004). It classifies F0-F5 damage as calibrated by engineers and meteorologists across 28 different types of damage indicators (mainly various kinds of buildings, but also a few other structures as well as trees). The scale takes into account the
40 typical strengths and weaknesses of different types of construction, since the same wind does different things to different kinds of structures. In the Enhanced Fujito Scale, there are different, customized standards for assigning any given F rating to a well-built, well-anchored wood-frame house compared to a garage, school, skyscraper, unanchored house, barn, factory, utility pole, or
45 other type of structure (U.S. Tornado Climatology 2011).

Most tornadoes (around 77%) in the U.S. are considered weak (EF0 or EF1) and about 95% of all U.S. tornadoes are below EF3 intensity (NOAA 2012). Based on this information, damages incurred by severe winds and tornadoes classified as EF0 and EF1 (per the Enhanced Fujito Scale)

will be considered a changed circumstance. Damages incurred by severe winds and tornadoes classified as EF2 – EF5 will be considered an unforeseen circumstance.

Tornado Adverse Affects on HED or Blanding's or spotted Turtle Habitat

5 When a tornado occurs and damages or destroys an AMM and/or mitigation effort covered by the HCP and located within the HMS permit area, HMS will implement conservation measures appropriate to remediate the circumstance. This would include an evaluation of the affected site, implementing corrective action and implementing additional monitoring (if appropriate).

10

Tornado Adverse Affects on Implementation of an AMM

Trigger: The trigger to implement corrective action where a tornado negatively affects the implementation of an AMM is when the AMM becomes ineffective due to the tornado. For example, a silt fence or infiltration galleries may be damaged due to the tornado.

15

Response: In response to the trigger, HMS will implement one or more of the following corrective actions:

20

(1) Restore the AMM; and or

(2) Clean-up the disturbed area to allow for the reestablishment of the AMM in that area. Repair to AMMs will be completed as soon as possible to protect species and their habitat. HMS will report to the USFWS any actions taken.

25

Tornado Adverse Affects on HED Mitigation Site

Trigger: The trigger to implement corrective action where a tornado negatively affects the establishment and/or maintenance of a mitigation site at any time during the life of the permit is if at least 25% of the vegetation established in the mitigation area is destroyed.

30

Response: In response to the trigger, HMS will implement one or more of the following corrective actions:

35

(1) Restore the destroyed portion of the mitigation site; and/or

(2) Clean-up the mitigation site to allow for normal growth of the new vegetation

8.2.7 Invasion of a New Plant Species

Description

40

Management of invasive species only applies to mitigation areas. Other areas within the Permit Area will be left in the condition they were at the start of the HCP. Invasive and weedy plant species have and continue to alter the composition, structure, and diversity of native plant communities in the Chicago region. These changes are usually detrimental to native plant species and typically result in altering the habitat of the animals that live in these communities. Invasive plant species of particular concern in the HCP area include reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnus*), and bush honeysuckles (*Lonicera maackii*, *L. tatarica*, etc.). Current lists of invasive plant species for the region will be consulted. All invasive species currently found in mitigation sites in the HCP Permit

45

Area, and identified as degrading the Covered Species habitat, will be managed according to the mitigation plans found in Chapter 5 and the Restoration Plan Set (Appendix F).

Changed vs. Unforeseen Circumstances

5 The occurrence of any new invasive species in a mitigation site in the HCP Permit Area and found on an invasive species list(s) agreed to by USFWS, IDNR, and HMS will be considered a changed circumstance. HMS will develop a management plan for new invasive species found in mitigation areas (and take measures to prevent introduction of new species) based on the best information available at the time. Any other invasive species not found on the agreed-to invasive species list and occurring on an HMS mitigation parcel will be considered an unforeseen circumstance and not planned or budgeted for. In addition, any infestation of a new invasive species or the spread of an existing invasive species (that cannot be controlled by any accepted management techniques) that results in a mitigation site not functioning (e.g. providing habitat) as designed for more than 1/5 of the years in the permit period (i.e. 6 years) is also considered an unforeseen circumstance.

Invasive Species Adverse Affects on HED Mitigation Site or Measure

10 HED avoid flying in densely wooded areas. Thus, invasive shrubs and weedy trees reduce or, if dense enough, eliminate adult use of habitat. They can also cause the reduction and or loss of larval habitat, if present. HED prefer wet prairie, sedge meadows, and native marsh communities for both feeding and breeding. Thus, the invasion or spread of invasive herbaceous species can also reduce or eliminate both adult and larval habitat.

15 Trigger: A relative increase over baseline conditions in the abundance ($\geq 25\%$ increase in absolute cover; e.g. 20% to 25% absolute vegetation cover) of an invasive plant species known to be present in a mitigation site at the beginning of the HCP and identified for management in the Mitigation Plan found in Chapter 5 or the Restoration Plan Set (Appendix F). This will only apply to those plant species with at least 10% absolute vegetation cover in larval habitat areas (i.e. those areas where USFWS herbiciding restrictions apply) and at least 25% absolute vegetation cover in non-larval habitat areas.

20 Response: HMS will inform USFWS and IDNR when it documents that a $\geq 25\%$ relative increase in absolute vegetation cover of an invasive species (with at least 10% absolute cover in larval habitat areas and at least 25% absolute cover in non-larval habitat areas) has occurred on the mitigation site. If this occurs, mitigation plans and execution will be evaluated by HMS in coordination with USFWS and IDNR. Invasive species management plans and techniques will be adjusted, as needed, to control and reduce the target species.

25 Trigger: The occurrence of a new invasive species in a mitigation site (i.e. on a local or regional invasive species list agreed to by USFWS, IDNR, and HMS, but not found on the mitigation site before) and at an abundance ($>10\%$ absolute vegetation cover) that threatens a site or substantial portion of a site's function as HED habitat.

30 Response: Upon written notification (and documentation) from HMS that a new invasive species has been found on the mitigation site at an abundance that threatens a site or substantial portion of a site's function as HED habitat ($>10\%$ absolute vegetation cover), a management plan for the new invasive species found in mitigation areas will be developed by HMS in coordination with USFWS and executed based on the best information (i.e. scientific data and BMPs) available at the time.

Invasive Species Adverse Affects on Blanding's and Spotted Turtle Mitigation Site or Avoidance Measure

BT and ST preferred habitat is open wetlands, such as native marsh communities and associated open water as well as sedge meadows and wet prairie. BT and ST are found less frequently in wooded wetlands. Thus, invasive shrubs and weedy trees can degrade or, if dense enough, eliminate BT and ST habitat. In addition, the invasion or spread of invasive herbaceous species can also degrade native open wetlands and reduce their suitability as BT or ST habitat.

10 Trigger: A relative increase over baseline conditions in the abundance (>25% increase in absolute cover; e.g. 25% to 32% absolute vegetation cover) of an invasive plant species known to be present in a mitigation site at the beginning of the HCP and identified for management in the mitigation plan found in Chapter 5 or the Restoration Plan Set (Appendix F). This only applies to species that have at least a 25% absolute vegetation cover.

15 Response: HMS will inform USFWS and IDNR when it documents that a >25% relative increase in absolute vegetation cover of an invasive species (with at least a 25% absolute vegetation cover) has occurred on the mitigation site. If this occurs, HMS will evaluate its mitigation plans and execution in coordination with USFWS and/or IDNR. Invasive species management plans and techniques will be adjusted, as needed, to control and reduce the target species.

20 Trigger: The occurrence of a new invasive species in a mitigation site (i.e. on an invasive species list agreed to by USFWS, IDNR and HMS but not found on the mitigation site before) and at an abundance (e.g. >10% absolute vegetation cover or RIV) that threatens a site or substantial portion of a site's function as BT or ST habitat.

25 Response: HMS will inform USFWS and IDNR when it documents that a new invasive species has been found on the mitigation site and at an abundance that threatens a site or substantial portion of a site's function as BT or ST habitat (>10% absolute vegetation cover), a management plan for the new invasive species found in mitigation areas will be developed by HMS in coordination with USFWS and/or IDNR and executed based on the best information (i.e. scientific data and BMPs) available at the time.

Invasive Species Adverse Affects on Leafy Prairie Clover or Lakeside Daisy

35 Leafy prairie clover (LPC) (*Dalea foliosa*) is found only in open limestone cedar glades, limestone barrens, and dolomite prairies. Lakeside daisy (LD) (*Hymenoxys herbacea*) is found in dry, rocky prairie grassland underlain by limestone. These species are not found in wooded wetlands. Thus, invasive shrubs and weedy trees can degrade or, if dense enough, eliminate LPC and LD habitat. In addition, the invasion or spread of invasive herbaceous species can also degrade native open prairies and reduce their suitability as LPC or LD habitat.

40 Trigger: A relative increase over baseline conditions in the abundance (>25% increase in absolute cover; e.g. 25% to 32% absolute vegetation cover) of an invasive plant species known to be present in a mitigation site at the beginning of the HCP and identified for management in the mitigation plan found in Chapter 5 or the Restoration Plan Set (Appendix F). This only applies to species that have at least a 25% absolute vegetation cover.

45 Response: HMS will inform USFWS and IDNR when it documents that a >25% increase in absolute vegetation cover of an invasive species has occurred on the mitigation site. If this occurs, mitigation plans and execution will be evaluated by HMS in coordination with USFWS and/or HMS HCP

IDNR, and invasive species management plans and techniques will be adjusted, as needed, to control and reduce the target species.

5 Trigger: The occurrence of a new invasive species in a mitigation site (i.e. on an invasive species list agreed to by USFWS, IDNR, and HMS but not found on the mitigation site before) and at an abundance (>10% absolute vegetation cover) that threatens a site's LPC or LD populations or habitat.

10 Response: HMS will inform USFWS and IDNR when it documents that a new invasive species has been found on the mitigation site at an abundance that threatens a site's LPC or LD populations or habitat (>10% absolute vegetation cover), and a management plan for the new invasive species found in mitigation areas will be developed by HMS in coordination with USFWS and executed based on the best information (i.e. scientific data and BMPs) available at the time.

15 **8.2.8 Invasion of a New Non-plant Species**

Description

20 Documented scientific research in the Permit Area regarding invasion of new non-plant macro-organisms, such as insects and vertebrates that negatively affect one of the "Covered Species." Such affects may include a new predator or a competing species.

Changed vs. Unforeseen Circumstances

25 Documented scientific research confirming the presence of a new non-plant macro-organism in the Permit Area that negatively affect one of the Covered Species. If this species is found on a publicly available regional invasive species list, it will be considered a changed circumstance. If the new invasive species is not on a publicly available regional invasive species list and has not been previously documented in the HCP Planning Area, it will be considered an unforeseen circumstance.

30 Trigger: Documented scientific research confirming the presence of a new non-plant macro-organism (found on a publicly available regional invasive species list) in the Permit Area that negatively affects one of the Covered Species. The USFWS and IDNR, who are responsible for monitoring federal and state species listings, will notify HMS in writing of the invasion and provide scientific data and other information documenting the effects on the Covered Species.

35 Response: Vegetation management and mitigation plans will be evaluated with USFWS to determine if changes are needed. Vegetation management and mitigation plans and techniques will be adjusted, as needed, to reduce the impact on Covered Species. However, other methods of controlling the species that do not involve changing management plans, such as direct removal of
40 the species, will also be considered.

8.2.9 Changes in Surface or Groundwater Hydrology, Including Flood

Description

45 Wetlands communities within the lower Des Plaines River Valley provide habitat for the animal species covered in this HCP (i.e. HED, ST, and BT). The hydrology of these wetlands is a function of river level, amounts of surface runoff, and groundwater recharge and discharge rates. Maintaining groundwater levels is important for some of the wetland communities that are preferred habitat for these species, such as wet dolomite prairies and sedge meadows. Groundwater

is especially important to the HED because its aquatic larvae are found in groundwater-fed wetlands and have specific temperature tolerances that are provided by discharging groundwater. In addition, surface water influences on these sensitive groundwater-fed wetlands are typically limited. Too much surface water runoff or abnormal backwater levels from the Des Plaines River may likely diminish the quality of groundwater-fed wetlands and reduce habitat quality for HED larvae.

Changed and Unforeseen Circumstances

Groundwater and surface water have been monitored on the HMS mitigation parcels for over a decade. Water level monitoring datasets have been used to document observed variations to establish baseline conditions at each of these sites (see Section 2.0 of the Groundwater Monitoring Plan in Appendix G-1). Historical groundwater elevations within HMS mitigation parcels have been plotted on cumulative frequency plots to show number of measurements, range of observed elevations, and proportion of observations relative to groundwater elevations. The information provided on the cumulative frequency plots, including frequency, difference in water level frequencies, range of elevations, and shape of the frequency curve have been used to develop low-level groundwater level monitoring triggers. They will also be used to evaluate future groundwater elevation monitoring data.

It can be reasonably assumed that groundwater levels will fluctuate. It is anticipated that water level variations will be similar to historically observed levels illustrated on the cumulative frequency curves (Attachment 1 of Appendix G-1). The process of monitoring, verification, assessment, and adjustment of avoidance measures is illustrated in the decision flow chart provided on Figure 4-1 in the Groundwater Monitoring Plan (Appendix G-1). Evaluation of potentially changed circumstances will be triggered coincidentally with adaptive management assessments that are triggered from routine, verification, and assessment monitoring criteria as defined in Section 4.1 of the Groundwater Monitoring Plan (Appendix G-1). Routine water level monitoring includes the collection and evaluation of groundwater levels, and the comparison of results against the groundwater level action criteria that includes: 1) maintenance of levels within planned ranges, 2) maintenance of levels within historical averages on a seasonal basis, and 3) consistency with regional elevations occurring in the Silurian Aquifer outside of the area of influence of Pierce Eich Quarry's cone of depression (refer to Section 4.2 of Appendix G-1). Additional data collected during assessment monitoring will be used in adaptive management evaluations. During this process, an evaluation will be conducted to determine if a changed circumstance has occurred (as described below). Adjustments to AMMs will also be considered in areas where such measures may have an influence on water levels returning to background conditions. Changed circumstances can be confirmed during the iterative process of data collection and evaluation stages of assessment monitoring, adaptive management evaluation/controls and contingency evaluation/implementation.

Groundwater variations likely related to site activities will be quickly addressed through the adaptive management strategies, including five day or less turnaround time for existing AMMs. However, changes in groundwater levels and groundwater quality are not anticipated at several parcels outside of the cone of depression resulting from surface mining conducted by HMS. Areas where no impacts to groundwater levels or groundwater quality are anticipated - based on groundwater modeling simulations - include Romeoville Prairie Nature Preserve and areas north of 135th Street/Romeoville Road, LPNP area south of Division Street, as well as all parcels located east of the canals. Therefore, verified groundwater level or water quality triggers (as defined in Table 2-2 and Attachment 2-Table 1 of Appendix G-1, respectively) in these areas where no impacts to groundwater levels or groundwater quality are anticipated, will constitute a potential unforeseen circumstance. Notification of potential unforeseen circumstance will be submitted in the

notification to initiate assessment monitoring. Unforeseen circumstances will be identified in the assessment monitoring report (submitted within 30 days of the notification letter) after preliminary assessment monitoring data can be reviewed that confirms changes to water levels or water quality.

5 If assessment monitoring is triggered in wells where no impacts are anticipated (outside of the estimated cone of depression from planned mining) but not observed in other monitoring wells that may be influenced by HMS' activities (i.e. within the estimated cone of depression from planned mining), these changes to the groundwater conditions are most likely due to factors outside of HMS' influence and will be considered an unforeseen circumstance. If, however, data are presented
10 by regulatory agencies that demonstrates that the actions of HMS are the cause of the decline in groundwater levels (and it is agreed upon in consultation with HMS), then HMS will (within 7 days of reaching conclusion in consultation) provide USFWS with documentation of planned corrective actions to address hydrology concerns. If such data are not presented and/or findings not agreed upon, the detected changes to groundwater conditions will be considered to be due to an action or
15 situation out of the control of HMS. This will be considered an unforeseen circumstance and HMS will not be responsible for addressing the degradation of hydrologic conditions. Under this situation, USFWS and IDNR along with other applicable regulatory agencies will address the cause of the adverse hydrology impacts. HMS will assist in addressing hydrology impacts by increasing monitoring frequency in monitoring wells closest to the unforeseen hydrologic impacts and by
20 providing monitoring data as needed.

Decrease in Ground Water Adversely Affects an HED Mitigation Site or Measure or Other Habitat Areas

25 Groundwater is especially important to the HED because its aquatic larvae are found in groundwater-fed wetlands and have specific water temperature requirements provided by groundwater discharging from dolomitic aquifers. A decline in groundwater levels from background conditions may result in the drying out of HED larval habitat.

30 Avoidance measures implemented for the River South Parcel and the north end of LPNP have been developed to be flexible so they can be adjusted to account for reasonably anticipated changes in future groundwater levels. Each avoidance measure is designed to provide or hold additional water to supplement current surface water storage and optimize the hydroperiod available for groundwater infiltration. The storage capability of these AMM features will help moderate groundwater reductions during periods of lower precipitation. Thus, conceptual designs have incorporated
35 anticipated fluctuation in groundwater levels.

River South / River South Bluff Parcel Water Levels

40 Trigger: The success of the avoidance measures at the HED mitigation sites is the maintenance of groundwater levels so they are at or above observed levels and seasonal averages of background datasets and correlate to trends within the Silurian Aquifer outside of the quarry's potential area of influence. The process of site inspections, collection of water level and water quality data, comparison to background levels, adjustment of avoidance measures (if needed), submission of data and findings to regulators, and the implementation of additional avoidance measures, if needed, is the adaptive management process that allows for changes in groundwater levels and water quality to
45 be addressed.

Due to its proximity to the open-pits of Romeoville Quarry, water level decreases at River South and River South Bluff Parcels will generally be the result of the expanding quarry footprint or the combined effect of mine expansion and third-party water well extraction. Groundwater modeling

simulations indicate seep discharges will decrease up to 25 to 30% along the eastern portion of the River South Bluff Parcel due to the planned surface mining included in this plan. Supplemental water will be added to three infiltration galleries within this parcel at rates up to 40 gpm to compensate for predicted impacts from Pierce Eich Quarry construction. These rates have been established through pilot infiltration field testing and comprehensive groundwater modeling efforts. The galleries and water distribution system supplying the supplemental water will be designed to handle roughly twice the predicted flow to account for natural variations in the distribution of the flow within the subsurface or underestimations in the predicted results. This additional capacity allows for flexibility in the avoidance measure. However, if greater quantities of supplemental water (more than 80 gpm) are required to meet groundwater level targets (defined in Section 4.2 of Appendix G-1) then this would be considered a changed circumstance. The need for additional supplemental water above the existing capacity would be identified during assessment monitoring. Additional supplemental water would be provided in a timely manner proposed by HMS (i.e. within 180 days) but developed in consultation with USFWS.

Response: HMS will support avoidance measures for the River South and River South Bluff Parcels through conditions that are reasonably anticipated to occur. Therefore, the maximum capacity of the infiltration galleries at River South (80 gpm) is being designed to account for an extended seasonal drought to occur during the final years of surface mining in the Pierce Eich Quarry. However, if more water is required (and changed circumstance is triggered) HMS will supply additional water at a rate of 80 gpm (for a total of 160 gpm) to the River South AMM to account for possible underestimations from gallery pilot testing and modeling simulations. If needed, an additional infiltration gallery would be constructed as a contingency measure to assist flow distribution in the parcel. If water level monitoring continued to indicate that even more supplemental water would be required to maintain historical levels, this would be considered an unforeseen circumstance since the maximum contingency pumping rate (160 gpm) is several times higher than the anticipated highest steady-state infiltration rate of 40 gpm.

If there is evidence that outside influences (e.g. new municipal wells) are affecting groundwater levels in the River South Parcel vicinity (regardless the amount of supplemental water needed), this will also be considered an unforeseen circumstance. Evaluation of potentially changed or unforeseen circumstances will be triggered coincidentally with adaptive management and contingency evaluation assessments and will be discussed with USFWS as outlined in the groundwater level monitoring flow chart (Figure 4-1 of Appendix G). USFWS may utilize the assessment monitoring data to investigate the cause of the change in ground water levels. If changes in groundwater levels are found not to be solely caused by HMS' action but by an action or situation out of the control of HMS, then HMS will not be held responsible or liable for the degradation of hydrologic condition. Rather, HMS would be proportionately responsible to address effects from their mining. Under this situation, USFWS and IDNR along with other applicable regulatory agencies will address the cause of the adverse water level impacts beyond the control of HMS. HMS will assist in addressing hydrology impacts and will provide additional monitoring data as it becomes available.

Water Levels in Other HMS Mitigation Parcels and Other Nearby Habitat Areas

Other measures are being considered to address and respond to possible unanticipated groundwater conditions (i.e. changed circumstances) in other HMS mitigation parcels and other nearby habitat areas, and some of these are briefly described below. These plans will be developed and

implemented if a changed circumstance in groundwater levels is detected through the groundwater monitoring process described in the Groundwater Monitoring Plan (Appendix G-1).

- 5 • North side of Quarry (RPNP) – An infiltration pond on Far North Parcel similar to the FPDWC property pond would be used to retain surface water that would otherwise run off-site directly to the Des Plaines River. The infiltration pond would be located on the north side of Far North Parcel and allow for more surface water to infiltrate and recharge groundwater. This infiltration area was originally conceived to provide a buffer from potential mining impacts to the hydrology of RPNP. However, groundwater modeling predicts that changes to groundwater levels or discharges in RPNP will not occur from the proposed mining of the Romeoville Quarry. Therefore, this avoidance measure is not planned to be implemented upon HCP approval unless groundwater level monitoring suggests there are unanticipated impacts (i.e. changed circumstance) from HMS mining north of this area.
- 10
- 15 • North side of Quarry (North, Far North and River North Parcels) – Additional water could be added to these parcels by pumping sump water into the drainage channel that enters from the west and flows to the wetlands on these parcels. This could be done as needed, especially during the dry season, to address unanticipated impacts (i.e. changed circumstance).
- 20
- 25 • Adjacent to Pierce Eich Quarry (e.g. Collegeview Subdivision) – Infiltration basins could be positioned outside of the active mining area in the Pierce Eich Quarry to be utilized as temporary avoidance measures should unexpected drawdowns (i.e. changed circumstance) occur in the Silurian Aquifer at local wells (such as the Collegeview Water Supply wells). Water collected in the Pierce Eich Quarry would be recirculated into the infiltration basins to minimize the effects of the surface mining.
- 30 • South side of Quarry (LPNP) – Additional water can be supplemented to the Silurian Aquifer through active infiltration immediately north of LPNP if a changed circumstance is detected in the data associated with the infiltration pond on FPDWC property. An infiltration basin and pond on Former Pipe Parcel would enable the capture of runoff from the large Lewis University watershed.

35 *River South / River South Bluff Parcel Water Quality*

Trigger: Groundwater and seep water quality will also be monitored. A 99% confidence interval about mean concentrations of routine groundwater and seep water constituents will be used to determine when assessment (potentially changed circumstance) monitoring is triggered for water quality. The water quality triggers are summarized in Attachment 2 of Appendix G-1. Changed circumstances will be iteratively evaluated and possibly confirmed during assessment monitoring, adaptive management evaluations and contingency reviews as outlined on the water quality monitoring flow chart for the River South and River South Bluff Parcels (Figure 4-2 of Appendix G-1). A changed circumstance will be confirmed if water quality parameters do not return to levels or concentrations that are within background datasets after continued assessment monitoring of contingency measures, as specified below.

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A changed circumstance will occur when HMS confirms a groundwater quality constituent that is above or below historically observed values for a period of three consecutive seasonal quarters.

Likewise, a changed circumstance will occur when HMS confirms background constituents in upgradient wells trend (either higher or lower) for three consecutive seasonal quarters. Seasonal quarters are defined in the Groundwater Monitoring Plan (Appendix G-1) as Spring (March, April & May), Summer (June, July & August), Fall (September, October, and November), and Winter (December, January & February). An unforeseen circumstance will occur after six out of ten quarters are observed to have water quality concentrations outside (higher or lower than) background levels or when HMS confirms background constituents in upgradient wells trend (either higher or lower) for six consecutive seasonal quarters. Background concentrations at specific sampling locations and media are defined in Attachment 2 of the Groundwater Monitoring Plan (Appendix G-1).

Response: Upon confirmation of a changed circumstance in groundwater quality concentration(s), assessment monitoring will continue, and an assessment monitoring report will be issued (within 30 days of receipt of data) following collection and analysis of additional water quality data. Assessment monitoring data may indicate that AMMs need to be modified to maintain effectiveness. Adjustment to the AMM's is part of the on-going management plan for groundwater resources at HED mitigation sites. However, if assessment monitoring suggests third parties are the cause of groundwater quality changes, the assessment monitoring data and analysis will be submitted to USFWS for review. USFWS may utilize the assessment monitoring data to investigate the cause of the change in ground water quality concentrations. If changes in groundwater quality are found not to be caused by HMS' action but by an action or situation out of the control of HMS, then HMS will not be held responsible or liable for the degradation of hydrologic condition. Under this situation, USFWS and IDNR along with other applicable regulatory agencies will address the cause of the adverse water quality impacts. HMS will assist in addressing hydrology impacts and will provide additional monitoring data as it becomes available.

LPNP Water Level and Water Quality Monitoring

Trigger & Response: HMS will provide and maintain avoidance measures for the LPNP through conditions that are reasonably anticipated to occur. Groundwater modeling indicates slight reductions in groundwater levels will be offset by the FPDWC Pond. Worst-case scenarios for drawdowns without the pond may be 0.2 to 0.3 feet at monitoring locations in LPNP north of Division Street, and the FPDWC Pond is designed to offset this level of change. If four consecutive quarterly measurements indicate trends in water levels (decreasing water levels) or water quality (increasing or decreasing) in LPNP monitoring wells outside of the FPDWC Pond monitoring wells (i.e., G-101, G-102, MW-6B, and MW-9B), then a changed circumstance will be triggered. Adjustments will be made to the FPDWC Pond AMM in order to maintain water levels in LPNP in response to the changed circumstance. However, unforeseen circumstances will occur if groundwater levels are maintained below the mean or seasonal mean levels (or water quality parameters are maintained outside background levels) for four consecutive quarters after contingency (changed circumstance) measures are implemented at the FPDWC Pond. If it is determined at any point that outside influences are likely affecting groundwater in LPNP area, this will also be considered an unforeseen circumstance. Assessment monitoring data will be collected to confirm trends in groundwater levels and groundwater quality data to detect if changed or unforeseen circumstances occur.

Decrease in Groundwater Adversely Affects a Blanding's Turtle or Spotted Turtle Mitigation Site or Measure

Groundwater is important to the BT and ST because they live in wetlands, such as marshes and sedge meadows, along with ponds and other slow-moving waters. A shallow water table and
HMS HCP

occasional groundwater discharge locations promote and/or provide surficial water to many of the wetlands within the HCP area (i.e. in the lower Des Plaines River Valley). Lower water table elevations or reduced groundwater discharge rates may result in the drying out of some wetlands which may lead to a reduction in BT and ST habitat.

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Trigger: A changed circumstance will occur when average groundwater levels over a five-year period in or near a mitigation parcel where AMM's are not present, such as North, Far North, ComEd and Long Run Parcels indicates a decline and is accompanied by a measurable change in wetland vegetation in the same parcel. A decline in water levels will be considered when 80% of seasonal averages are less than background averages over the five-year period (or 48 of the 60 months). Measurable change in wetland vegetation in the same parcel will be determined through a 30% decrease in total cover (if at or below 100% total cover) or 30% increase in Mean Wetness from baseline. A 50% decrease in total cover (if at or below 100% total cover) or 50% increase in Mean Wetness from baseline will be considered an unforeseen circumstance. HMS will monitor vegetation on its mitigation parcels, but not on property owned or managed by others.

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Response: Upon documentation of a decrease in five-year groundwater level averages accompanied by change in wetland vegetation in the same parcel, HMS will investigate the cause of the reduced ground water levels and will report their findings to USFWS.

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If it is determined through consultation among HMS and regulatory agencies that the actions of HMS are the cause (in part or completely) of the decline in groundwater levels, then HMS will (within 60 days) provide USFWS with documentation of planned corrective actions to address hydrology concerns. If changes in groundwater levels are found to be in part caused by HMS' action as well as an action or situation out of the control of HMS, then HMS will not be held fully responsible or liable for the degradation of hydrologic condition. Rather, HMS would be proportionately responsible for addressing effects from their activities. However, if the decline is found not to be caused by HMS' action but by an action or situation out of the control of HMS, then an unforeseen circumstance will be triggered, and HMS will not be responsible for addressing the degradation of hydrologic condition. Under this situation, USFWS and IDNR along with other applicable regulatory agencies will address the cause of the adverse hydrology impacts. HMS will assist in addressing hydrology impacts and providing monitoring data as needed.

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Change in Surface Water Due to Flood

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For the purpose of this HCP, the definition of a flood is adapted from the Illinois Emergency Management Agency (IEMA) as "a general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land." Since 1981, 99 of the 102 counties in Illinois have been federally declared as major disaster areas due to flooding. Will County has had four federally declared flood disasters since 1981 (IEMA 2011).

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Data from the nearest U.S. Geological Survey (USGS) gauge (#05532500) on the Des Plaines River, located approximately 22 miles upstream of the HCP Area in Riverside, Illinois, indicate that in the past 60 years, the river has been above flood stage (7.0 ft) at that location a total of 24 times (IDNR OWR 2009 and USGS 2011). While it is likely that not all of these flood events impacted the HCP Area, winter and spring events caused by a combination of rainfall and snowmelt are more likely to have impacted downstream areas than summer events caused by isolated thunderstorms (pers. comm., staff hydrologist, National Weather Service Chicago Office). Since 1948, 14 winter

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and spring flood events have been recorded at the Riverside gauge including three moderate (8.0 ft) winter/spring floods in 1948, 1982, and 1997, and one major (9.0 ft) flood in 1969 (IDNR OWR 2009 and USGS 2011). Severe summer weather has caused summer flood events to impact the HCP Area twice in recent years; strong thunderstorms caused a four-day flood in August 2007 which impacted the HCP Area, and the remnants of Hurricane Ike produced a four-day major flood in September 2008 (NCDC 2007 and 2008). These were the longest two flood periods recorded in the area over the past 18 years (USGS 2011). The closest and most optimal gauge on the Des Plaines River, per the USGS NWIS website (https://waterdata.usgs.gov/nwis/uv?site_no=05533600), is located immediately upstream of the Permit Area at Lemont (#05533600). Although this gauge is too new (installed in 2010) to provide much historical data, it will enable more accurate detection of flood-stage water levels in this area of the river in the future.

Heavy downpours are now twice as frequent in the Midwest as they were a century ago. Both summer and winter precipitation levels have been above average for the last three decades, the wettest period in a century. The Midwest has experienced two record-breaking floods in the past 15 years. Due to the effects of climate change, precipitation is likely to continue to increase in winter and spring, with more heavy downpours. This is expected to lead to more frequent periods of flooding (USGCRP 2009). In addition, increased flooding is also likely to promote disease (see Section 8.2.12).

Changed Circumstance vs. Unforeseen Circumstance

Floods have been frequent and regular events in northeast Illinois over the past 60 years and appear to have increased in severity in the past two decades; 15 of the 24 recorded flood events on the Des Plaines River at Riverside in the 60 years prior to 2011 have occurred since 1993. This means that floods have occurred in 71% of the years since 1993. Therefore, HMS anticipates that floods will occur frequently during the permit duration, particularly during the late winter/early spring snowmelt periods and following severe summer storms. As a result, a changed circumstance will be more than 21 documented flood events (water levels above flood stage (13.2 ft) at the new Lemont gauge and subsequent flooding of HCP area documented by a recognized expert) within the 30-year permit period. Twenty-eight flood events (or more) during the permit period will be an unforeseen circumstance. A changed circumstance also will be three flood events per calendar year, as none of the past 60 years have seen river levels exceeding flood stage more than twice a year near the HCP Area (IDNR OWR 2009 and USGS 2011). The fourth flood and any subsequent floods in a calendar year will be considered unforeseen circumstances. Two major flood events (water levels above major flood stage (15.0 ft) at the new Lemont gauge (NOAA 2020) and subsequent flooding of HCP area documented by a recognized expert) during the permit duration will be considered a changed circumstance, but any additional major floods will be considered an unforeseen circumstance as river levels exceeding major flood stage have been recorded only twice in the Des Plaines River near the HCP Area in the 60 years prior to 2011 (IDNR OWR 2009 and USGS 2011). Any floods lasting longer than four days will also be considered a changed circumstance, as no flood in the past 18 years has lasted longer than four days, even following the Hurricane Ike storm system (USGS 2011). Any floods lasting longer than five days will be considered an unforeseen circumstance.

Hine's Emerald Dragonfly

HED are likely adapted to regular flooding events which are common in the HCP Area. However, severe or persistent flooding may impact HED reproduction and/or recruitment by affecting aquatic and emergent vegetation structure in wetland habitats. Flooding may also disrupt hydrological processes in HED habitats by inundating slowly flowing streamlets and other sources of surface

water with high volumes of flood water. Sedimentation and pollution associated with the erosion and runoff during flood events may impact water quality or pH.

5 Trigger: The trigger to initiate a response is the documentation of three flood events in a year in the HCP Planning Area (or any other flood frequency defined as a changed circumstance above) following the detection of water levels above flood stage at USGS gauge #05533600 on the Des Plaines River at Lemont and observation of resultant damage to infrastructure (e.g. rail ballast or culverts) designed to maintain or enhance the hydrology of HED habitat at a mitigation site.

10 Responses: Following the damage to infrastructure designed to enhance or maintain the hydrology of an HED mitigation site, HMS will be responsible for repairing the damage if it owns the infrastructure. If not, USFWS will contact the owner about the damage, and USFWS and HMS will cooperate with the owner as needed to help make the repairs, but HMS will not be responsible for making the repairs. If, due to flood impacts on hydrology infrastructure or other mitigation
15 measures, a new mitigation site is established, habitat (i.e. streamlets) at the abandoned mitigation site will not be replaced or repaired but will instead be established at the new site, preferably in the Des Plaines River Valley.

20 Trigger: The trigger to initiate a changed circumstance response is documentation of three flood events in the HCP Area within a year (or any other flood frequency defined as a changed circumstance above) following the detection of water levels above flood stage at USGS gauge #05533600 on the Des Plaines River at Lemont and observation of the removal or destruction of more than 25% of the adult HED habitat (i.e. vegetation cover) (or more than 20% in larval habitat areas) which has been restored or protected on a parcel as part of the mitigation plan (Chapter 5 and
25 Appendix F) at any point in the permit duration. Removal or destruction of more than 50% of adult habitat (or 40% of larval habitat) will be considered an unforeseen circumstance.

Responses: Upon documentation from HMS of the loss of more than 25 percent of adult HED habitat (or 20% of larval habitat) restored or protected as part of the HCP, HMS will take one of the
30 following actions: (1) work to re-establish HED habitat (e.g. streamlets or vegetation) at the original mitigation site, or (2) establish the original level of mitigation at a new mitigation site, preferably in the Des Plaines River Valley.

Blanding's and Spotted Turtles

35 BT and ST are unlikely to be affected by the regular flooding events which occur in the HCP Area. Woody debris and other basking habitat may be covered during periods of flooding, but a reduction in basking habitat is unlikely to affect BT unless the flood event persists for several days or washes most debris downstream, and ST rarely basks on woody debris. Recruitment success of these
40 species may be impacted if wetland or upland nesting habitat is inundated by severe flooding during the breeding season. Sedimentation and pollution associated with the erosion and runoff during flood events may impact water quality or pH.

45 Trigger: The trigger to initiate a changed circumstance response is the documentation of three flood events in a year (or any other flood frequency defined as a changed circumstance above) in the HCP Planning Area by a recognized expert following the detection of water levels above flood stage at USGS gauge #05533600 on the Des Plaines River at Romeoville and observation of resultant damage to infrastructure (i.e. rail ballast, culverts, streamlets) designed to maintain or enhance the hydrology of BT and ST habitat at a mitigation site.

Responses: Following three flood events in a year and damage of infrastructure designed to maintain or enhance the hydrology of a covered turtle mitigation site, HMS will be responsible for repairing the infrastructure if they own it. If not, USFWS will contact the owner about the damage, and USFWS and HMS will cooperate with owner as needed to make the repairs. If, due to flood impacts on other mitigation measures, a new mitigation site is established, habitat at the abandoned mitigation site will not be replaced or repaired but will instead be established at the new site.

Trigger: The trigger to initiate a changed circumstance response is documentation of three flood events in a year (or any other flood frequency defined as a changed circumstance above) in the HCP Planning Area by a recognized expert following the detection of water levels above flood stage at USGS gauge #05533600 on the Des Plaines River at Lemont and observation of the removal or destruction of more than 25% of higher quality BT or ST habitat, such as preferred wetland habitat (i.e. marsh (not dominated by *Phragmites*), wet prairie, and sedge meadow) and dispersal habitat between core wetlands habitats in any parcel which has been restored or protected as part of the mitigation plan (Chapter 5 and Appendix F) at any point in the permit duration. Removal or destruction of more than 50% of higher quality BT and ST habitat will be considered an unforeseen circumstance.

Responses: Upon documentation of three flood events in a year and the loss of more than 25% of higher quality BT or ST habitat restored or protected on a parcel as part of the HCP, HMS will take one of the following actions: (1) work to re-establish BT or ST habitat at the original mitigation site, (2) establish the original level of mitigation in a new mitigation site, preferably in the Des Plaines River Valley.

8.2.10 Accidental Harmful Human Activity

Description

Harmful activities are those that are caused by HMS or its contractors during mining, restoration or management, or any other work that negatively impacts a Covered Species or their habitat (e.g. spills, tire ruts).

Changed Circumstance vs. Unforeseen Circumstance

Documented negative impact on a Covered Species or its habitat caused by HMS employees or contractors based on a site inspection and investigation of the accident by HMS, in coordination with the USFWS and IDNR, will be considered a changed circumstance. Any accidental harmful human activities that result from third parties are not the responsibility of HMS and will be considered an unforeseen circumstance.

Trigger: Documented negative impact on a Covered Species or its habitat caused by HMS employees or contractors based on a site inspection and investigation of the accident by HMS in coordination with USFWS and IDNR. HMS will notify USFWS and IDNR within 24 hours of learning of an accident, so the site inspection and investigation can be coordinated.

Response: If it is determined, based on the investigation, that the accident was caused by HMS or one of its contractors, HMS will work with USFWS, IDNR, and other state and federal agencies, as necessary, to develop and implement an appropriate response to a changed circumstance. Typical corrective actions will include restoring the impacted area to pre-disturbance conditions. All responses will be approved by USFWS and IDNR. HMS will report to USFWS and IDNR any

actions taken. Actions necessary to respond to the disturbance will be mitigated for in accordance with Chapter 5 if they should impact the species or its habitat.

8.2.11 Vandalism or Other Destructive or Illegal Human Activity

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Description

Vandalism or other destructive or illegal human activities include unauthorized use of a vehicle (on or off road) through vegetation, poaching, trespassing, and dumping of materials within the CHUs in the Permit Area. There is little history of vandalism or other destructive activities on HMS property in the Romeoville facility, thus very little is anticipated during the permit period. Therefore, two incidents during the permit period will be considered a changed circumstance and four will be considered unforeseen.

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Changed and Unforeseen Circumstances

Documenting two acts of vandalism or other destructive or illegal human activity on an HMS mitigation parcel based on a site assessment in coordination with the USFWS and IDNR will be considered a changed circumstance. Documented four or more acts of vandalism or other destructive or illegal human activity on an HMS mitigation parcel based on a site assessment in coordination with the USFWS and IDNR will be considered an unforeseen circumstance. HMS will notify USFWS and IDNR within 24 hours of learning of possible vandalism or destructive or illegal activity on one of their mitigation parcels, so the site inspection and investigation can be coordinated.

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Trigger: Documentation of two or more acts of vandalism or other destructive or illegal human activity based on a site inspection and investigation by HMS, in coordination with the USFWS and IDNR.

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Response: After documentation of two or more acts of vandalism on HMS' mitigation parcels, HMS will work with the USFWS, IDNR, and other state and federal agencies to develop and implement an appropriate response. Typical corrective actions will include restoring the impacted area to pre-disturbance conditions. All responses will be approved by USFWS and IDNR, and HMS will report to USFWS and IDNR any actions taken. After four or more acts of vandalism (an unforeseen circumstance), HMS will contact USFWS but will not be required to take corrective action.

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8.2.12 Disease

Description

During the term of the requested permit, it is anticipated that disease may affect some of the Covered Species or their habitat within the HCP area. Diseases which may affect HED are not currently known. However, other species of dragonfly are known to be affected by parasitic diseases, such as the parasite-caused metabolic disease identified in the twelve-spotted skimmer (*Libellula pulchella*) by Marden and Schilder (Kennedy 2006). BT and ST may be susceptible to a variety of coccidian, hemoflagellate, and monogean parasites, as well as lung flukes, roundworms, leaches, and others. However, little is known about whether such parasites negatively affect populations (Congdon and Keinath 2006). Vegetation which comprises habitat for the HED, BT, and ST within the HCP area may be subject to diseases caused by parasitic fungi, bacteria, viruses, nematodes, and other organisms (Asselin 2011). It is not possible to predict with any certainty the frequency, extent, or severity of disease outbreaks. However, climate change may influence the

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effects of disease on Covered Species or their habitat. In general, diseases tend to be more prevalent in warmer climates, and plants and animals stressed by increased temperatures may be more susceptible to disease. Occurrence of current diseases within the HCP area may increase, and new diseases may arrive with increased temperatures.

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Changed Circumstance vs. Unforeseen Circumstance

As part of this HCP's changed circumstances, HMS will address any detrimental disease once over the permit duration. A detrimental disease is one that is confirmed to harm a Covered Species or interfere with, damage, disrupt, or destroy planned minimization or mitigation measures. Should a detrimental disease outbreak be confirmed more than once over the permit duration, the circumstance will be considered unforeseen.

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Hine's Emerald Dragonfly

HED populations may be particularly vulnerable to the impacts of disease based on the small, isolated nature of most populations and the limited genetic diversity of the species as described in the original recovery plan for the species (USFWS 2001). A disease could have devastating effects on a population that does not have the genetic diversity to allow some members to survive the disease or on a population that is too isolated to be bolstered by immigration.

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Trigger: The trigger to initiate a response by HMS to address disease affecting an HED population is written notification from USFWS of the disease. Notification shall include documented scientific research and/or evidence from recognized experts (i.e. those who have been studying HED for at least 10 years) that confirms the presence of a disease and demonstrates a negative effect on the HED population. HMS will also notify USFWS if they become aware of a disease affecting the HED populations on their properties.

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Responses: In the event that disease is demonstrated to negatively affect HED populations and threaten their continued existence within the HCP area, avoidance, minimization, and mitigation measures would be reevaluated. HMS will coordinate with USFWS and IDNR to develop and implement revisions to the HCP that attempt to lessen the impact of the disease on the HED.

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Trigger: HMS will inform USFWS and IDNR when it documents a disease affecting the establishment of vegetation for suitable HED habitat mitigation, including documented evidence from researchers or consultants that confirms the presence of a disease and demonstrates a negative effect on the ability to establish and maintain suitable vegetation in the HCP Planning Area.

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Responses: In the event that disease is demonstrated to affect the establishment and maintenance of vegetation for suitable HED habitat mitigation, HMS will attempt to restore or replace the existing mitigation on-site or establish additional mitigation at a new site to replace the affected portion of the original site.

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Blanding's and Spotted Turtle

Blanding's turtle populations may be vulnerable to impacts from disease based on the life strategy of the species, which is characterized by high adult survival rates and high longevity but delayed sexual maturity, small clutch size, and low reproductive rates (Lee 1999). Spotted turtle is also a long-lived species with delayed sexual maturity (requiring 7 to 14 years to reach sexual maturity). If a disease significantly impacts the survival rate of sub-adult or adult age classes of a population, recruitment levels may not be high enough to prevent the population from declining.

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5 Trigger: The trigger to initiate a response by HMS to address disease affecting a Blanding's or spotted turtle population is written notification from USFWS or IDNR of documented evidence that confirms the presence of a disease and demonstrates a negative effect on the Blanding's turtle or spotted turtle population in the HCP Planning Area. HMS will also notify USFWS if they become aware of a disease affecting Blanding's or spotted turtle populations on their properties.

10 Responses: In the event that disease is demonstrated to negatively affect populations of Blanding's or spotted turtle and threatens their continued existence within the HCP area, avoidance, minimization, and mitigation measures would be reevaluated. HMS would coordinate with USFWS and IDNR to develop and implement revisions to the HCP that attempt to lessen the impact of "take" incurred by protected species due to disease.

15 Trigger: HMS will inform the USFWS and IDNR when a disease negatively affecting the establishment of vegetation for suitable Blanding's or spotted turtle habitat mitigation is identified through monitoring or documented by researchers or consultants that confirms the presence of a disease and demonstrates a negative effect on the ability to establish and maintain suitable vegetation.

20 Responses: In the event that disease is demonstrated to negatively affect the establishment and maintenance of vegetation for suitable Blanding's or spotted turtle habitat mitigation, HMS will attempt to restore or replace the existing mitigation on-site, or establish additional mitigation at a new site to replace the affected portion of the original site.

25 **8.2.13 Oil Spills or Gas Leaks**

Description

30 Numerous oil and gas pipelines run through and adjacent to property within the HCP Permit Area. Almost ten years ago two oil leaks occurred within the HCP Planning Area within a few months of each other. The Enbridge spill near Romeoville Prairie released about 250,000 gallons of crude oil in September 2010, and the West Shore/Buckeye Pipeline spill released approximately 74,000 gallons on HMS' Long Run Parcel and adjacent properties in December 2010. Since 2000, an average of approximately 24 pipeline incidents per year have occurred in Illinois (PHMSA 2020). The U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) defines pipeline incidents as those resulting in fatality or injury resulting in hospitalization, \$50,000 or more in total costs, highly volatile liquid releases of five barrels or more or liquid releases of 50 barrels or more, and/or liquid releases resulting in unintentional fire or explosion.

Changed and Unforeseen Circumstances

40 Oil pipeline leaks (from a third party) of the size (250,000 gallons) and frequency (two per year) that have occurred in the HCP area will be considered a changed circumstance. More frequent (>2/year) or larger (>250,000 gallons) oil spills will be considered an unforeseen circumstance. Any gas pipeline leak or explosion will be an unforeseen circumstance. Any oil spills or natural gas pipeline leaks that result from pipeline company integrity digs are not the responsibility of HMS and will be considered an unforeseen circumstance.

An Oil Spill Adversely Affects a HED Mitigation Site or Measure

An oil (crude or refined) spill in HED habitat will result in the total loss of habitat in the area contaminated by the oil and possibly the taking of individual HED affected by the spill. All
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5 vegetation and animal life will be killed or greatly harmed in this area. All larval HED and any adult HED that come in direct contact with the oil will be killed. Other nearby adult HED may be harmed by the oil vapors/fumes, and other larval HED downstream of the spill may be harmed or killed by exposure to toxic compounds (e.g. VOCs, SVOC, and metals) in the water released (via surface or groundwater) from the oil in the spill area.

Trigger: An oil spill (of 250,000 gallons or less and at a frequency of no more than two a year) in areas containing habitat for HED or upstream of HED habitat on HMS property.

10 Response: The oil and pipeline companies are responsible for the response and clean-up of the oil spills. The USEPA is the lead federal agency during the response and clean up phase. HMS will work with the oil and pipeline companies, the USEPA, and any other involved private entities or public agencies, as HMS did with the Buckeye spill, to clean up the spill as quickly as possible in order to minimize damage to natural resources, as well as property and public health. HMS will also
15 work closely with the oil and pipeline companies, USFWS, and others involved during the restoration phase. HMS will plan, but not budget, for oil spills, because all costs to remediate will be the responsibility of the oil and pipeline company.

20 New and additional safeguards, such as improved early/immediate pipeline leak detection systems, may be required to be put in place by the pipeline companies in this area as a result of the recent spills.

An Oil Spill Adversely Affects a Blanding's Turtle or Spotted Turtle Mitigation Site or Measure
25 An oil (crude or refined) spill in BT or ST habitat will result in the total loss of habitat in the area contaminated by the oil and possibly the taking of individual BT or ST affected by the spill. All vegetation and animal life, including BT and ST, that come in direct contact with the oil will be greatly harmed or killed. Other BT and ST outside the spill area but nearby may be harmed by the oil vapors/fumes, and others downstream of the spill may be harmed by exposure to toxic
30 compounds (e.g. VOCs, SVOCs, and metals) in the water released (via surface or groundwater) from the oil in the spill area.

35 Trigger: An oil spill from a third party (of 250,000 gallons or less and at a frequency of no more than two a year) in areas containing habitat for BT or ST or upstream of BT or ST habitat on HMS property.

40 Response: The oil and pipeline companies are responsible for the response and clean-up of the oil spills. The USEPA is the lead federal agency during the response and clean up phase. HMS will work with the oil and pipeline companies, the USEPA, and any other involved private entities or public agencies, as HMS did with the Buckeye spill, to clean up the spill as quickly as possible in order to minimize damage to natural resources, as well as property and public health. HMS will also work closely with the oil and pipeline companies, USFWS, and others involved during the restoration phase. HMS will plan, but not budget, for oil spills because all costs to remediate will be the responsibility of the oil and pipeline company.

45 New and additional safeguards, such as improved early/immediate pipeline leak detection systems, may be required to be put in place by the pipeline companies in this area as a result of the recent spills.

8.2.14 Train Derailment

Description

5 Several railways traverse the HCP Permit area, including one railroad line on the west side of the Des Plaines River owned by NRG Energy , and two railroad lines on the east side of the Des Plaines River, one owned by Canadian National (CN) and one owned by Burlington Northern Santa Fe (BNSF). In addition to the railroad line owners, other railroad companies have trackage rights to operate on each of these lines (e.g. CN, Amtrak, Metra, and Union Pacific).

10 *Changed Circumstance vs. Unforeseen Circumstance*

Due to the presence of train traffic through the HCP Area and the unpredictable nature of such accidents, one train car derailment in a protected area occupied by the Covered Species will be considered a changed circumstance. However, train car derailments are rare events and additional derailments (i.e. more than one) throughout the duration of the permit period will be considered
15 unforeseen.

Hine's Emerald Dragonfly

20 An accidental train car derailment along one of the railroad lines in an area occupied by HED could have direct or indirect impacts. The magnitude of these impacts would be dependent on a number of variables including: (1) the location of the derailment, (2) the nature of the derailment (i.e. number of cars, loaded vs. unloaded cars, contents of cars, cars remaining upright vs. contents spilled, etc.), (3) the time of year (active vs. inactive HED periods), and (4) the success of restoration efforts.

25 **Trigger:** The trigger to initiate a response from HMS is notification that an accidental train car derailment has occurred in an HCP mitigation area.

30 **Responses:** In the event of an accidental train car derailment, HMS will respond by coordinating with the responsible party(ies) (i.e. railroad line owner and operator) and natural resource regulatory agencies to: (1) determine the extent of impacts to HED and HED habitat, (2) develop an emergency (i.e. short term) response plan, and (3) develop an appropriate long-term response and habitat restoration plan. The railroad will be fully responsible for all restoration and cleanup activities, including funding, from the train car derailment.

Blanding's Turtle and Spotted Turtle

35 An accidental train car derailment along one of these railroad lines in an area occupied by BT or ST could have direct or indirect impacts. The magnitude of these impacts would be dependent on a number of variables including: (1) the location of the derailment, (2) the nature of the derailment (i.e. number of cars, loaded vs. unloaded cars, contents of cars, cars remaining upright vs. contents spilled, etc.), (3) the time of year (active vs. inactive covered turtle periods), and (4) the success of
40 restoration efforts.

45 **Trigger:** The trigger to initiate a response by HMS is notification that an accidental train car derailment has occurred in a protected area occupied by Blanding's turtle or spotted turtle or a mitigation area restored for Blanding's turtle or spotted turtle.

Responses: In the event of an accidental train car derailment, HMS will respond by coordinating with the responsible party(ies) (i.e. railroad line owner and operator) and natural resource regulatory agencies to: (1) determine the extent of impacts to BT or ST or their associated habitat, (2) develop an emergency (i.e. short term) response plan, and (3) develop an appropriate long-term response

and habitat restoration plan. The railroad will be fully responsible for all restoration and clean up from the train car derailment.

8.3 Conclusion

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To mitigate for the impact of changed circumstances that may occur during the permit term and may require an immediate response, HMS will implement the adaptive management process incorporated into this HCP. As described in Chapter 6, adaptive management is an iterative process that when applied to changed circumstances will include: 1) gathering data through monitoring; 2) assessing monitoring results and effects on Covered Species; 3) implementing in coordination with USFWS and IDNR, if needed, changes to the conservation program (including planned response to changed circumstances); and 4) monitoring and evaluating the effectiveness of the adaptive management strategies. This will be done when changes in management practices are necessary to achieve or maintain the HCP's biological objectives and to respond to unexpected monitoring results or new scientific information. In emergency or time sensitive situations, HMS will notify USFWS and IDNR but will not await a response from these agencies before they make such changes and will report to USFWS and IDNR any actions taken pursuant to this section.

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For those identified changed circumstances that are not as time-critical in nature, HMS and the appropriate state and federal agencies will confer and agree upon the appropriate adaptive changes and refinements in the management of the species, habitats, or other important areas that may be impacted by any changed circumstance. If, through the on-going coordination and cooperation of HMS with USFWS, IDNR, and other aligned agencies throughout the permit duration, specific new management strategies are identified to address changed circumstances, they will be developed and implemented as deemed necessary and appropriate. This, however, will not require any additional resources from HMS than those already identified in the HCP.

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While HMS believes that the initial measures to be enacted and funded through its commitments will be effective in contributing to the recovery of the Covered Species and their habitats, it is anticipated that conditions within the HCP area, including the protected habitats, and the overall condition of individual species will change over time. Therefore, adaptive management will be used in implementing avoidance, minimization, and mitigation measures, as well as changed circumstances. When a determination is made that an aspect of the HCP mitigation and conservation plans is not meeting its intended objectives, HMS, USFWS and IDNR will evaluate the causal factors and determine what additional adaptive management measures may be necessary to ensure that the objectives of this HCP continue to be met under the identified changed circumstance.

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9.0 AMENDMENT PROCESS

An HCP and/or ITP may be modified in accordance with the ESA, the USFWS' implementing regulations, and this chapter. HCP and permit modifications are not anticipated on a regular basis; however, modifications to the HCP and/or ITP may be requested by either HMS or USFWS. USFWS also may amend the ITP at any time for just cause, and upon a written finding of necessity, during the permit term in accordance with 50 C.F.R. § 13.23(b). The categories of modifications are administrative changes, minor amendments, and major amendments.

9.1 Administrative Changes

Administrative changes are internal changes or corrections to the HCP that may be made by HMS, at its own initiative, or approved by HMS in response to a written request submitted by USFWS. Requests from USFWS shall include an explanation of the reason for the change as well as any supporting documentation. Administrative changes on HMS' initiative do not require preauthorization or concurrence from USFWS.

HMS will document each administrative change in writing and provide USFWS with a summary of all changes, as part of its annual report, along with any replacement pages, maps, and other relevant documents for insertion in the revised document.

Administrative changes include the following:

- Corrections of typographical, grammatical, and similar editing errors that do not change intended meanings;
- Corrections of any maps, tables, or appendices in the HCP to reflect approved amendments, as provided below, to the HCP, IA, or ITP.

9.2 Minor Amendments

Minor amendments are changes to the HCP whose effects on HCP species, the conservation strategy, and HMS' ability to achieve the biological goals and objectives of the HCP are either beneficial or not significantly different from those described in the HCP. Such amendments also will not increase impacts to the listed species, their habitats, and the environment beyond those analyzed in the HCP, NEPA document, and the BO or increase the levels of "take" beyond that authorized by the ITP. Minor amendments also may require an amendment to the ITP. The USFWS and HMS must approve a proposed minor amendment in writing before it may be implemented. Any proposed minor amendment will become effective on the date of the written approval.

HMS or USFWS may propose minor amendments by providing written notice to the other party. Such notice shall satisfy the provisions of 50 C.F.R. § 13.23 as well as include a description of the proposed minor amendment; the reasons for the proposed amendment; an analysis of the environmental effects, if any, from the proposed amendment, including the effects on covered species and an assessment of the amount of take, if any, of the species; an explanation of the reason(s) the effects of the proposed amendment conform to and are not different from those described in the HCP as originally adopted; and any other information required by law. When HMS proposes a minor amendment to the HCP, USFWS may approve or disapprove such amendment, or recommend that the amendment be processed as a major amendment as provided below. USFWS will provide HMS with a written explanation for its decision. When USFWS proposes a minor

amendment to the HCP, HMS may agree to adopt such amendment or may choose not to adopt the amendment. HMS will provide USFWS with a written explanation for its decision. USFWS retains its authority to amend the ITP, however, consistent with 50 C.F.R. § 13.23. Proposed minor amendments require a public notice in the Federal Register.

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Providing a proposed amendment is consistent in all respects with the criteria in the first paragraph of this section, minor amendments include, but are not limited to, the following:

- Updates to the land cover map or to take species occurrence data;
- 10 • Changes to any measure in the conservation strategy to respond to changed circumstances, as described in Chapter 8 of the HCP;
- Minor changes to survey or monitoring protocols that are not proposed in response to adaptive management and that do not adversely affect the data gathered from those surveys;
- 15 • Minor changes to the reporting protocol.

9.3 Major Amendments

20 A major amendment is any proposed change or modification that does not satisfy the criteria for an administrative change or minor amendment. Major amendments to the HCP and ITP are required if HMS desires, among other things, to modify the projects and activities described in the HCP such that they may affect the impact analysis or conservation strategy of the HCP, affect other environmental resources or other aspects of the human environment in a manner not already analyzed, or result in a change for which public review is required. Major amendments must
25 undergo the same formal review process as the original HCP and ITP, including appropriate NEPA analysis, a Federal Register notice, and an intra-USFWS Section 7 consultation.

In addition to the provisions of 50 C.F.R. § 13.23(b), which authorize USFWS to amend an ITP at any time for just cause and upon a finding of necessity during the permit term, the HCP and ITP
30 may be modified by a major amendment upon HMS' submission of a formal permit amendment application and the required application fee to USFWS, which shall be processed in the same manner as the original permit application. Such application generally will require submittal of a revised Habitat Conservation Plan and preparation of an environmental review document in accordance with NEPA. The specific document requirements for the application may vary,
35 however, based on the substance of the amendment. For instance, if the amendment involves an action that was not addressed in the original HCP or NEPA analysis, the documents may need to be revised or new versions prepared addressing the proposed amendment. If circumstances necessitating the amendment were adequately addressed in the original documents, an amendment of the ITP might be all that would be required.

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Upon submission of a complete application package, USFWS will publish a notice of the receipt of the application in the Federal Register, initiating the NEPA and HCP public comment process. After the close of the public comment period, USFWS may approve or deny the proposed amendment application. HMS may, in its sole discretion, reject any major amendment proposed by
45 USFWS.

Changes that would require a major amendment to the HCP and/or ITP include, but are not limited to:

- Revisions to the covered lands that do not qualify as a minor amendment;
- Addition of a species to the ITP that was not addressed or not adequately analyzed in the HCP, NEPA document and the BO;
- 5 • Increases in the amount of take allowed for covered activities or adding new covered activities to the HCP;
- Modifications of any action or component of the conservation strategy under the HCP, including AMMs, mitigation, funding, or schedule, that may increase the levels of take authorized by the ITP or substantially change the effects of the covered activities on Covered Species, the nature or scope of the conservation program, or consequences to the human environment;
- 10 • A major change in performance standards if monitoring or research indicates that existing performance standards are not attainable because technologies to attain them are either unavailable or infeasible, and the new performance standards were not contemplated in this original HCP and the associated NEPA document.
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9.4 Treatment of Changes Resulting from Adaptive Management or Changed Circumstances

Unless explicitly provided in Chapters 6 or 8 of this HCP, the need for and type of amendment to deal with Adaptive Management or Changed Circumstances will be determined by USFWS, in
20 coordination with HMS, at the time such responses are triggered.

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11.0 LIST OF ACRONYMS

Acronym	Definition
AES	Applied Ecological Services, Inc.
AMM	Avoidance and Minimization Measure
ASWMP	alternative stormwater management practice
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
BT	Blanding's turtle
CCAP	Chicago Climate Action Plan
CFR	Code of Federal Regulations
CH	Critical Habitat
CHU	Critical Habitat Unit
CN	Canadian National
ComEd	Commonwealth Edison
CSS	Chicago Sanitary and Ship Canal
EA	Environmental Assessment
EF Scale	Enhanced Fujita Scale
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FPD	Forest Preserve District
FPDCC	Forest Preserve District Cook County
FPDDC	Forest Preserve District DuPage County
FPDWC	Forest Preserve District of Will County
FQI	Floristic Quality Index
GAS	Graef, Anhalt, Scholemer and Associates
GHA	Gewalt Hamilton Associates, Inc.
GIS	Geographic Information System
HCP	Habitat Conservation Plan
HED	Hine's emerald dragonfly
HMS	Hanson Material Service
I&M	Illinois & Michigan
ICC	Illinois Commerce Commission
IDNR	Illinois Department of Natural Resources
IEMA	Illinois Emergency Management Agency
IEPA	Illinois Environmental Protection Agency
IESPA	Illinois Endangered Species Protection Act
IESPB	Illinois Endangered Species Protection Board
ILCS	Illinois Compiled Statutes
INHS	Illinois Natural History Survey
INPC	Illinois Nature Preserve Commission
IPCC	Intergovernmental Panel on Climate Change
ISWS	Illinois State Water Survey

ITA	Incidental Take Authorization
ITP	Incidental Take Permit
IUCN	International Union for the Conservation of Nature
LD	Lakeside daisy
LPC	leafy prairie clover
LPNP	Lockport Prairie Nature Preserve
LTPD	Lockport Township Park District
MVP	Minimum Viable Population
MWGen	Midwest Generation
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago
NEPA	National Environmental Policy Act
NIIPP	Northern Illinois Invasive Plant Partnership
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PCE	Primary Constituent Elements
PDSI	Palmer Drought Severity Index
PVA	Population Viability Analysis
RIV	Relative Importance
ROW	Right of Way
RPNP	Romeoville Prairie Nature Preserve
ST	Spotted turtle
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WDNR	Wisconsin Department of Natural Resources
WFO	Weather Forecast Office