

**BIOLOGICAL OPINION
PROPOSED ISSUANCE OF AN INCIDENTAL TAKE PERMIT FOR THE
FEDERALLY ENDANGERED AMERICAN BURYING BEETLE
*Nicrophorus americanus***

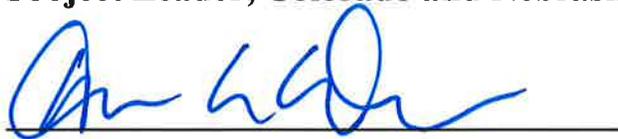
**NEBRASKA PUBLIC POWER DISTRICT
R-PROJECT TRANSMISSION LINE**

TAILS No. 06E00000-2019-F-0001

**Consulting Agency:
U.S. FISH AND WILDLIFE SERVICE
Mountain Prairie Region
Denver, Colorado**

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Date _____

TABLE OF CONTENTS

TABLE OF CONTENTS	2
INTRODUCTION.....	3
CONSULTATION HISTORY	3
BIOLOGICAL OPINION	5
DESCRIPTION OF PROPOSED ACTION.....	5
Action Area	5
Description of the Applicant’s Proposed Covered Activities	6
Avoidance and Minimization Measures Proposed for the American Burying Beetle	11
Mitigation Measures Proposed for the American Burying Beetle.....	13
Monitoring and Adaptive Management Measures	13
Reporting.....	14
STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE	14
Status and Distribution	14
Threats.....	16
Reproduction/Active Periods.....	17
Feeding.....	17
Habitat	17
ENVIRONMENTAL BASELINE	18
Status of the Species within the Action Area	18
Factors Affecting Species Environment within the Action Area.....	21
EFFECTS OF THE ACTION	22
Interrelated and Interdependent Actions.....	24
Species Response to the Proposed Action.....	24
CUMULATIVE EFFECTS	27
CONCLUSION	28
INCIDENTAL TAKE STATEMENT.....	29
AMOUNT OR EXTENT OF TAKE ANTICIPATED.....	30
EFFECT OF THE TAKE	30
REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS.....	31
Procedures for Handling and Disposing of American Burying Beetles	31
REINITIATION NOTICE.....	31
LITERATURE CITED.....	32

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) on the issuance of an incidental take permit (ITP) under section 10 of the Endangered Species Act (ESA) based on our review of the R-Project Habitat Conservation Plan (hereafter referred to as the HCP) (NPPD 2018a) submitted by the applicant, Nebraska Public Power District (NPPD), for the R-Project transmission line (R-project). The HCP was submitted by NPPD as part of their application for an ITP of the federally listed endangered American burying beetle (*Nicrophorus americanus*) (ABB). This BO is prepared in accordance with section 7 of the ESA (16 U.S.C. 1531-1544, 87 Stat. 884), as amended).

The issuance of this ITP is a Federal action requiring consultation under section 7 of the Act. The covered activities will be undertaken and funded by NPPD and are without a Federal action. The Service, through intra-Service consultation, is fulfilling the requirement of section 7 of the ESA. The purpose of formal section 7 consultation is to insure that any action authorized, funded, or carried out by the federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of the species.

We determined that the project is not likely to adversely affect the federally listed endangered interior least tern (*Sterna antillarum*), whooping crane (*Grus americana*), blowout penstemon (*Penstemon haydenii*) and the federally listed threatened piping plover, (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), Northern long-eared bat (*Myotis septentrionalis*), and Western prairie fringed orchid (*Platanthera praeclara*) based on our review of the description and location of NPPD's proposed covered activities and NPPD's proposed implementation of avoidance and minimization measures for each species. We determined that the project will have no effect on the federally listed endangered Topeka shiner (*Notropis topeka*) because this species does not occur within the project area. The determinations and rationale for each of these species are provided in the transmittal memo for this BO and will not be discussed further in this document.

The bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*), both species protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668d), were also evaluated. After review of the minimization measures in the Migratory Bird Conservation Plan for this project (NPPD 2018b), the Service determined that the expected risk to eagles is low and take of an eagle is not anticipated.

This BO is based on best available scientific and commercial data including information provided in the Applicant's HCP, the Environmental Impact Statement (EIS), telephone conversations, meetings, field investigations, and other sources of information. A complete record of this consultation is on file in the Nebraska Ecological Services Field Office.

CONSULTATION HISTORY

The following is a summary of correspondence, teleconferences, and meetings that informed discussions about R-Project impacts to federally listed threatened and endangered species.

May 24, 2012: A teleconference was held with NPPD, Service, and Nebraska Game and Parks Commission (NGPC) to discuss the R-Project as identified in the Southwest Power Pool's Integrated Transmission Plan 10-year Assessment Report.

December 12, 2012: A project coordination meeting was held with NPPD and its consultants, Service, and NGPC to determine if federally listed threatened and endangered species would be covered or evaluated.

March 25, 2014-Present: Regular technical meetings were held with the Service, NPPD and its consultant, and NGPC to discuss project details, conservation measures for covered and evaluated species, permit location and duration, ABB survey results, and method to calculate the total amount of anticipated ABB take. Conference calls between the above parties regarding technical issues were also held in August and September 2013.

September 2014-Present: Monthly teleconferences were held among the Service, NPPD, NGPC, and various consultants to discuss the status and progress of the HCP and other aspects related to preparation of the EIS pursuant to the National Environmental Policy Act (NEPA).

October 30, 2014: Service published a Notice of Intent in the Federal Register to inform the public of its intent to prepare an EIS that assesses the impacts on the human environment from the proposed issuance of an ITP to authorize the incidental take of the ABB and implementation of an HCP (79 FR 64619).

May 8, 2015: A coordination meeting was held with the Service, NPPD and consultants. NPPD formally stated that the R-Project could not be constructed unless the Service issued an ITP, which resulted in the broadening of the scope of NEPA analysis.

May 29, 2015: A draft HCP for the previous R-Project route selected by NPPD was provided to the Service and NGPC for review and comment. Consolidated Service and NGPC comments were provided on the draft HCP to NPPD.

September 11, 2015: A meeting was held at the Service's Regional Office in Denver, Colorado to discuss feasibility of other less impactful route alternatives on federally listed species, migratory birds, and bald and golden eagles.

September 30, 2015: A revised draft HCP for the previous R-Project route selected by NPPD was provided to the Service and NGPC for review and comment. Consolidated Service comments were provided on the draft HCP back to NPPD.

May 16, 2016: A meeting was held at the Service's Regional Office in Denver, Colorado to discuss application by NPPD for a section 10 permit for the whooping crane and to discuss less impactful R-Project route alternatives.

April 4, 2017: A revised version of the draft HCP was prepared by NPPD.

May 12, 2017: Drafts of the EIS, HCP, Migratory Bird Conservation Plan, and Land Restoration Plan were made available for a 60-day public comment period in the Federal Register (82 FR 22153) with a comment period that closed on July 12, 2017.

September 7, 2017: A 60-day public comment period was reopened for drafts of the EIS, HCP, Migratory Bird Conservation Plan, and Land Restoration Plan from September 7, 2017 through November 8, 2017.

March 14, 2018: NPPD obtained the option to purchase a 600-acre parcel to provide mitigation for the impacts of the project to the ABB.

February 8, 2019: Service published a Notice of Availability in the Federal Register to announce the availability of the final EIS, final HCP, and associated documents for the R-Project.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The Federal action the Service is evaluating in this BO is the Service's issuance of a section 10(a)(1)(B) ITP to NPPD for the incidental take of ABB associated with the 225-mile long, 345-kilovolt R-project. As part of the requirements for obtaining an ITP, NPPD has prepared an HCP (NPPD 2018a, entire) in coordination with the Service. The requested 50-year ITP term will cover the operational life of the project. A 50-year permit duration provides take coverage for construction of the R-Project, as well as emergency repairs that may be required throughout the life of the transmission line.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purposes of this BO, the Service has determined that the action area is the HCP permit area (Figure 1), which is a subset of the entire R-Project. The entire R-Project route is depicted in Figure 1 of this BO, Figure 1-2 of the HCP, and is described in detail in Chapters 1.2 and 2.4.1 of the FEIS.

The permit/action area includes all portions of the R-Project that intersect with the ABB range based on predicted probability of occurrence in the ABB species distribution model for Nebraska's Sandhills (Jorgensen et al. 2014, entire). NPPD calculated the total area of available ABB habitat in the permit area as 503,963 acres. The ABB is a habitat generalist that may occur in multiple land cover types and is therefore assumed to be present in all habitats within the permit area. In addition, because NPPD was unable to access all private lands and assign habitat ratings along the entire route, NPPD assumed in the HCP that all disturbed acres are ABB habitat and present equal high-quality value to ABB. For compliance monitoring purposes, areas where project activities to be conducted that are not likely to support ABB (i.e., regularly tilled or mowed land, developed lands and urban areas, land with standing water or lacking vegetation) will be identified prior to the onset of construction and will be reported to the Service in NPPD's first annual compliance report (NPPD 2018a, p. 123).

The permit/action area begins where the R-Project crosses Nebraska Highway 92 at the town of Stapleton, Nebraska, and continues north to the Thedford Substation and then east to the new Holt County Substation (approximately 162 miles of the total 225-mile route). The area from Stapleton to the Thedford Substation includes 1 mile on either side of the R-Project centerline (a total of 2 miles wide) for 38.4 miles and a total area of 49,450 acres, while the area from the Thedford Substation to the Holt County Substation includes 4 miles on either side of the R-Project centerline (a total of 8 miles wide) for 123.6 miles and a total area of 623,317 acres. The varying width of the permit/action area incorporates all potential impacts occurring outside the transmission line right-of-way (ROW) including construction access and construction yards (i.e., temporary work areas, staging sites, fly yards, or other areas of disturbance associated with project construction and maintenance). The permit/action area between Stapleton and the

Theford Substation is narrow because the R-Project largely follows existing highways along this segment and all temporary disturbances would be within 1 mile of the transmission line. Conversely, from the Theford Substation to the new Holt County Substation, existing access is limited, and the permit/action area must be wider to encompass all construction access.

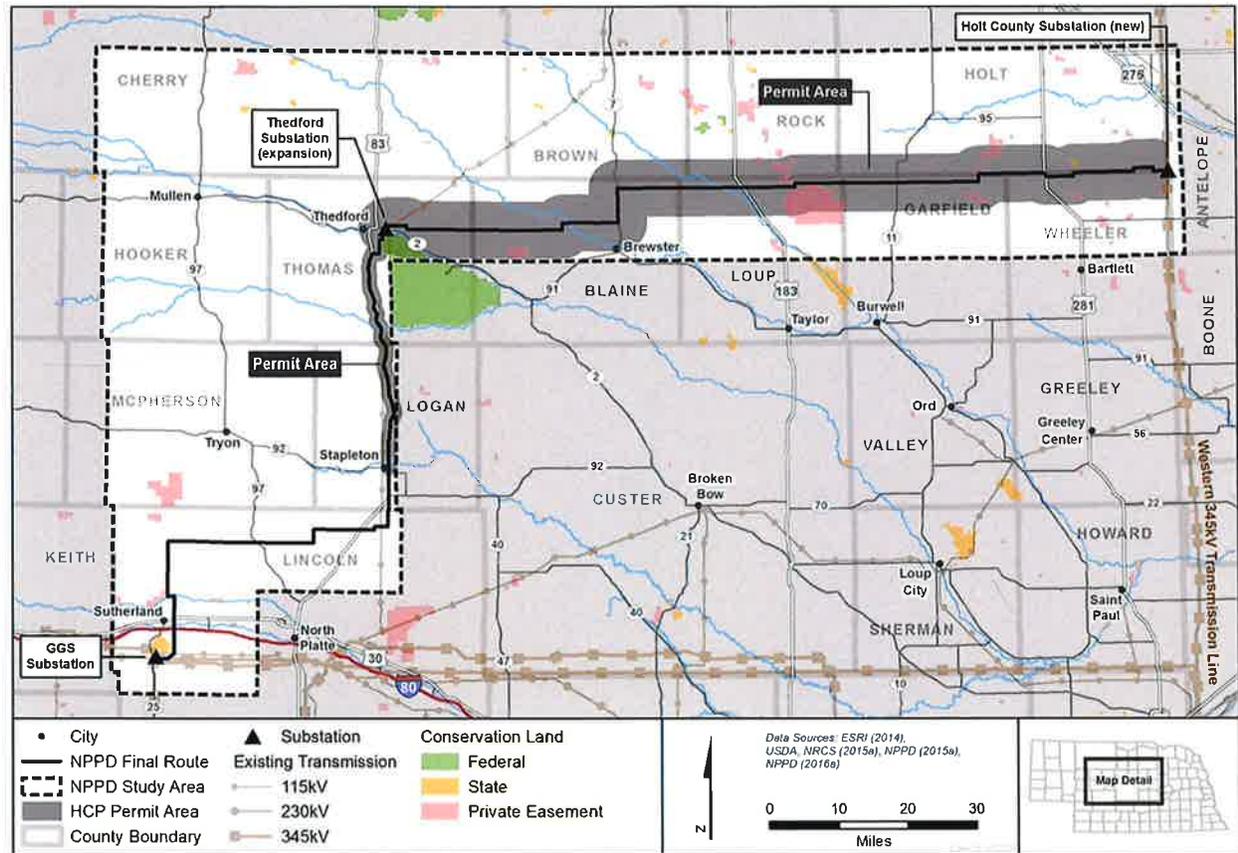


Figure 1. NPPD Final Route and HCP Permit Area/Action Area for ESA section 7

Description of the Applicant’s Proposed Covered Activities

Covered activities are those that are likely to result in incidental take of ABB and would be authorized by the ITP. Further details describing these activities, as well as those project activities that would not result in take, can be found in Chapter 2 of the HCP and Chapter 2.4 of the FEIS, which are hereby incorporated by reference.

Covered activities for the R-Project are those associated with the construction and emergency repairs for the proposed transmission line and are summarized below in Table 1. Table 1 provides a list of each covered activity associated with the R-Project and the estimated temporary and/or permanent disturbance acreage associated with each activity. Temporary impacts are disturbances to grasslands in the Sandhills that will later be restored following the methods and activities described in the Restoration Management Plan (NPPD 2018c, entire); these impacts could affect habitat that supports ABB and would result from construction activities and emergency repair activities. Based on the climate and vegetation types in Nebraska, the Service expects that most grass-dominated cover types can be re-established. The goal of the Restoration Management Plan is to meet the restoration success criteria for the restoration of ABB habitat

within five years post-construction. Permanent impacts are disturbances to grasslands in the Sandhills that will not be restored and thus will no longer support habitat for the ABB (i.e. structure foundation, substations).

Table 1. Covered Activities and associated Temporary and Permanent Disturbance Estimates within the Permit Area/Action Area for ESA section 7

COVERED ACTIVITY	ESTIMATED TEMPORARY DISTURBANCE (ACRES)	ESTIMATED PERMANENT DISTURBANCE (ACRES)
CONSTRUCTION		
Access		
Temporary Access Scenario 2	192	--
Permanent Access Scenario 3 ¹	--	19
ROW Preparation		
ROW Tree Clearing ²	29	--
Temporary Work Areas		
Fly Yards/Assembly Areas	156	--
Construction Yards/Staging Areas	82	--
Pulling and Tensioning Sites	192	--
Temporary Structure Work Areas		
Lattice Tower	129	--
Steel Monopole	219	--
Structure Foundation Excavation/Installation		
Helical piers – lattice tower	--	0.61
Standard foundation – steel monopole	--	0.25
Distribution Power Line Relocation		
Distribution power line relocation	43	0.09
Well Relocation		
Well relocation	0.4	--
Substation		
Thedford Substation	--	13
Construction Subtotal	1,042	33
OPERATION AND MAINTENANCE		
Emergency Repairs ³	208	--
TOTAL	1,250	33

¹Temporary access routes under Access Scenario 2 may be left in place following completion of construction depending on landowner requests and requirements for operation and maintenance of the line. These routes would then be classified as Access Scenario 3 and represent a permanent impact. No more than 10% (19 acres) of Access Scenario 2 will be left in place following construction.

²Trees will not be allowed to re-grow within ROW. ROW will be converted to grassland.

³Disturbance from emergency repairs is estimated at 20% of the temporary disturbance from construction in the permit area. Disturbed areas would be restored if conditions require restoration efforts.

CONSTRUCTION

Access

The R-Project will maximize use of existing roads and two-tracks wherever feasible for accessing structure locations during construction to minimize ground disturbance. Large areas of the Sandhills do not have an existing road network, such as section line roads. In these areas, overland access and temporary access easements will be required in order to access structure locations and work areas during construction and maintenance.

ROW Preparation

ROW width will typically be 200 feet (100 feet each side of centerline) for the entire transmission line unless otherwise specified. Mature trees under or near the conductors will be removed to provide adequate electrical clearance as required by NPPD's Transmission Vegetation Management Standard No. OG-T&D-St-002. Herbicides may be applied directly to tree stumps to prevent regeneration.

Temporary Work Areas

Fly Yards/Assembly Areas and Construction Yards/Staging Areas

Temporary work areas will be required for materials and equipment storage and staging for construction activities. The materials storage yards will serve as field offices, reporting locations for workers, parking space for vehicles and equipment, storage of construction materials, and fabrication and assembly sites. Fly yards will be used for helicopter construction where materials and equipment are loaded into slings or choker cables for transport and placement at structure locations via helicopter. Fly yards will be located within the same footprint as lattice tower assembly areas. Fly yards/assembly areas and materials storage yards will be located along existing access roads and in previously disturbed areas when practicable. Grading and fill of these sites may be required. Due to the heavy equipment use and traffic within the confines of these sites, gravel will be placed on the ground surface to prevent soil erosion and sediment runoff. Equipment used to construct and operate within fly yards/assembly areas and materials storage yards may include, but is not limited to, earthmoving equipment, a heavy crane, semi-trucks, helicopters, and support vehicles. Upon completion of R-Project construction, all fill, including gravel, will be removed, soils decompacted, and the area revegetated to the appropriate specifications as detailed in Section 3.3 of the Restoration Management Plan.

Pulling and Tensioning Sites

Wire pulling and tensioning sites are locations where specialized equipment, including winch trucks, light crawler tractors, or excavators, is used to spool out and tension the conductors and shield wires. Along tangent sections of the line, pulling and tensioning sites will be located approximately every two to four miles for steel monopoles and four to six miles for lattice towers. Pulling and tensioning sites will require two acres of temporary disturbance. Additional pulling sites are needed where major turns in the line occur. These angle structure or point-of-intercept sites will require pulling and tensioning in two directions to allow for the angle in the line. Wire pulling and tensioning sites will be cleared and bladed only to the extent necessary to perform construction activities safely. Equipment used at pulling and tensioning sites may include, but is not limited to, semi-trucks, tensioner pullers (large machine winch), heavy cranes to move reels, and matting to level the site.

Temporary Structure Work Areas

At each structure location, a temporary work area will be needed for construction lay-down, structure assembly, and structure erection. To the extent necessary, the work area will be cleared of vegetation and bladed to create a safe working area for placing equipment, vehicles, and materials. In grassland areas, little if any clearing of vegetation will be needed. The ground disturbance required for lattice tower work areas is 100 feet by 100 feet and for steel monopole work areas is 200 feet by 200 feet. After line construction, all areas not needed for normal transmission line maintenance will be graded to blend as closely with the natural contours as possible; these areas will then be revegetated. Equipment that may be used to prepare structure work areas varies depending on the structure type. Lattice towers can be constructed with lighter equipment and helicopters, and thus may not require a prepared structure work area. Steel monopole structures require heavier equipment in relation to lattice towers and will likely require some improvement to the structure work area to support construction. Equipment used to prepare structure work areas may include, but is not limited to, small Bobcat-sized earthmoving equipment.

Structure Foundation Excavation/Installation

Two types of structures will be used for this transmission line: tubular steel monopoles and steel lattice towers. Excavation will be required for the steel monopole structure foundations. Foundation holes will be excavated using a truck- or excavator-mounted auger. Steel lattice towers will be used in areas of the Sandhills where existing access roads are limited or do not exist. Lattice towers can be constructed with less overall impact to the surrounding area with the use of smaller equipment and helicopters.

Distribution Power Line Relocation

The selected route for the R-Project overlaps with approximately 28 miles of existing overhead distribution power lines owned and operated by various rural utility providers. Of these 28 miles of existing distribution power lines, 20 miles will be relocated as overhead and eight miles will be relocated underground. Distribution power line poles are much smaller than those used for transmission lines and have smaller ROW and span lengths. The average span length for distribution power poles is 200 feet. Relocation of existing overhead distribution lines would require a single line truck called a digger-derrick truck. Each relocated distribution structure would require a 2,400-square-foot (40-foot x 60-foot; 0.06 acre) work area. The digger-derrick truck would not require access improvements. Installation of underground distribution lines will require a small tracked trenching machine, which will dig a six-inch-wide trench where the conductor will be placed. A 14-foot-wide travel path is assumed for the trenching machine to move down the underground distribution line ROW.

Well Relocation

NPPD will relocate four existing wells that supply livestock watering tanks and irrigation pivots along the R-Project centerline. Existing wells will be capped, and new wells will be drilled. New wells likely will be relocated approximately 150 feet from their current location to provide electrical clearance during installation and for future maintenance by the landowner. A well drilling truck will be required for the installation of the relocated wells. Each well will require a 2,400-square-foot (40 x 60 feet; 0.06 acre) work area. A small tracked trenching machine will be used to run a pipe from the relocated well to the livestock watering tank. Each pipe will be

approximately 150 feet long. A 14-foot-wide travel path is assumed for the trenching machine to move along the pipe.

Substations

Thedford Substation

The Thedford Substation expansion site is located in Thomas County, east of Thedford, west of the existing Thedford 115 kV Substation and north of State Highway 2. The current land use of the site is pasture/rangeland. The substation expansion will encompass approximately 13 acres. The major components of the substation will include 345 kV breakers and associated disconnect switches, 345 kV reactors, 345 kV dead-end structures, 345 kV bus and associated support structures, fencing, grounding, and a control building with protection and control devices.

OPERATION AND MAINTENANCE

Emergency Repairs

Emergency repairs include those which require an immediate response by NPPD personnel to ensure the safe and efficient operation of the transmission line. Emergency repairs may be completed at any time of the year, including the ABB active season, and may include the use of any equipment necessary to complete the repair. Any effects from emergency repairs would be temporary and NPPD would restore areas if conditions require restoration efforts. The majority of effects from emergency repairs, if any, will result from the need to obtain access to structures. Repairs will be made as soon as NPPD can obtain parts and necessary equipment and ensure compliance with applicable measures in the HCP to the maximum extent practicable.

While the exact location of emergency repairs cannot be predicted, NPPD can estimate the acres potentially disturbed. NPPD estimates that the acres that will be temporarily disturbed from emergency repairs will be equal to 20 percent of the total temporary disturbance that will occur during construction. This 20 percent estimate includes repairs to isolated damages, such as single insulators or weak points on conductors noted during annual inspection, as well as large-scale repairs following severe weather events. Data from NPPD records on lattice tower transmission lines of similar design to and in the vicinity of the R-Project were reviewed by NPPD to determine the extent of past storm damage and other emergency repair needs identified during annual inspections. These records indicate that emergency repairs were required for an average of 15 percent of an overall line's length. The R-Project is designed to have storm structures installed every eight to ten miles to further limit storm damage and the need for emergency repairs; these structures are specifically designed to contain damage to the transmission line to one section and prevent damage from continuing down the line. NPPD stated that the use of storm structures is another measure that will limit the amount of emergency repairs required over the life of the R-Project.

Routine maintenance and repairs

Routine maintenance and repairs are not included as a Covered Activity. All routine maintenance and repairs will not take place until 30 years after construction of the transmission line. Routine maintenance and repairs can be scheduled ahead of time and do not immediately threaten the continued operation of the transmission line. All routine maintenance and repairs will be scheduled to take place within the ABB non-active season (October through April), will use low-ground-pressure equipment when possible, and will not require any ground

improvements for access (temporary fill or other improvements that would disturb ABB habitat). By following these avoidance and minimization measures, routine maintenance and repairs will have no effect on individual ABB or their habitat and are thus not included as a Covered Activity.

Avoidance and Minimization Measures Proposed for the American Burying Beetle

In order to limit impacts from these covered activities, NPPD has committed to implementing avoidance and minimization measures. These avoidance and minimization measures were designed to meet the objectives for Goal 1 of the HCP's conservation plan (Chapter 6.0 of the HCP), which is to maintain or restore ABB habitat within the permit area to support a sustainable ABB population. The identified objectives to achieve that goal are: 1) during project construction, ensure permanent disturbance of ABB habitat does not exceed 33 acres and temporary disturbance of ABB habitat does not exceed 1,042 acres from R-Project covered activities, and 2) within five years post-construction, establish vegetation on disturbed sites with basal ground cover at least 80 per cent of adjacent reference plots, thus restoring ABB habitat. The avoidance and minimization measures are summarized below, and details of each measure are described in Chapter 6.2.1 of the HCP. The Service has analyzed the effects of the proposed action based on the assumption that all of these avoidance and minimization measures will be implemented.

- **Avoidance of ABB high-density areas** - NPPD considered the ABB habitat suitability model (Jurzenski et al. 2014) when developing potential routes within the Study Area. Routes were sited where predicted occurrence of ABB is comparatively less.
- **Avoidance of sub-irrigated wet meadows and mesic grasslands** - ABB is a habitat generalist when foraging. However, the species requires areas with some element of moist soils (i.e., wet meadows and edges of wetlands) during periods of inactivity (Panella 2013, p. 4); we therefore consider sub-irrigated wet meadows and mesic grasslands as some of the most likely ABB habitat.
- **Use of existing roads and two-tracks for access to minimize ground disturbance.**
- **Use of temporary improvements for access** - These areas will be revegetated upon completion of construction and, upon revegetation, will provide ABB habitat, thereby reducing permanent impacts to ABB habitat.
- **Overland access with low-ground-pressure equipment** - Overland access will utilize existing two-tracks where available, will be conducted with low-ground-pressure tracked or rubber-tired equipment, will not require improvements (blading or fill), and will drive over vegetation rather than remove it, thus retaining ABB habitat.
- **Siting temporary work areas in areas unsuitable for ABB use** - NPPD will coordinate site visits with the Service and NGPC to confirm areas unsuitable for ABB use prior to final siting of fly yard/assembly and construction yard/staging areas.
- **Use of helical pier foundations in Sandhills** - Helical pier foundations for lattice structures require fewer pieces of equipment, a smaller temporary structure work area, and less improved access to each structure than traditional foundations on steel monopole structures. Helical pier foundations do not require excavation, and thus the use of these structures minimizes disturbance.

- **Use of helicopters for construction** - The use of helicopters for covered activities will reduce the need for ground access for large construction equipment at each structure location. Helicopter flights used in the construction of power lines are covered under visual flight rules and do not require the filing of formal flight plans with the FAA. However, the helicopter pilots and construction contractor will develop an internal daily flight plan for the preferred flight path of that day's activities. Daily flight plans will likely be developed one to two days prior to the placement of structures and are heavily dependent on local weather conditions and topographic features. The daily flight plan will follow the safest and most direct route possible between the fly yard/assembly area and structure locations.

Note: While not a measure for ABB, NPPD has committed to avoiding sensitive features in the daily flight plan which may include, but are not limited to, occupied homes, businesses, concentrations of cattle, active bald eagle nests, and large concentrations of waterfowl or cranes.

- **Winter construction** - Covered activities associated with identified structures including work areas, structure erection, and stringing, pulling, and tensioning will occur from December 1 through February 28. When covered activities are completed during this time period, effects to individual ABB will be greatly reduced because individuals will be buried to their overwinter depth beneath the frost line and protected by a layer of frozen soil. Because construction will take approximately 21 to 24 months to complete, some construction activities will be completed during the winter construction timeframe.
- **Limited nighttime construction during periods when ABB are active** - In the event that nighttime construction is required, sodium vapor and downshield lighting would be used. The rare nature of nighttime construction, combined with the application of specified lighting, will limit the likelihood of attracting ABB to active construction areas at night.
- **Sodium vapor lighting and downshield lighting** - Permanent lighting will not be required on transmission support structures within the permit area. The Thedford Substation is located within the permit area and will require limited permanent lighting for security purposes. Downshield sodium vapor lighting will be installed in these instances to prevent attracting ABB to the substation.
- **Limited mowing and windrow vegetation in specified areas** - Mowing and windrowing (i.e., removal) of vegetation, if applied, would be implemented in very limited instances and will be coordinated with the Service prior to the onset of covered activities. Mowing, removing, and maintaining vegetation to less than eight inches will create areas unsuitable for ABB use and therefore, ABB will not occupy these areas (Service and NGPC 2008, p. 37).
- **Limited removal of carrion at structure locations along existing roads in specified areas** - Carrion removal, if applied, would be implemented in very limited instances with the input of the Service and NGPC. The purpose of this measure is to reduce the likelihood that ABB would occur in that area.
- **Application of herbicides during daytime hours** - All application of herbicide treatments for noxious weeds will be completed during the day time. This will eliminate the possibility that herbicides could be applied directly to an ABB because individuals would be underground during the herbicide application.

- **Restoration of ABB habitat will be completed in areas where temporary disturbance have occurred as described in the Restoration Management Plan** - To ensure restoration is successful, NPPD will establish an Escrow Account. See Section 6.2.2 of the HCP for a full description of this Escrow Account.
- **Worker Educational Awareness Program** - All personnel entering R-Project work areas, including contractors, will receive environmental training to emphasize compliance with all project-wide environmental requirements.

Mitigation Measures Proposed for the American Burying Beetle

Goal 2 of the HCP's Conservation Plan in Chapter 6.1 is to protect habitat that supports individuals in the Sandhills ABB population. To achieve this goal, the HCP aims to protect in perpetuity a particular amount of occupied ABB habitat based on Service-approved mitigation ratios described in Section 6.2.2 of the HCP. Based on these ratios, the calculated total of required mitigation acres is 474 acres. However, the HCP calls for at least 500 acres of mitigation, since that is the standard recommended minimum size for beetle mitigation lands (Service 2014, p. 13). This measure is intended to offset the impacts of take from the R-Project, including temporary and permanent loss, degradations, and fragmentation of ABB habitat. Table 6-2 of the HCP details the number of impacted and mitigation acres for each category and is further discussed in this BO's section on Effects of the Action.

NPPD has secured an Option to Purchase for approximately 600 acres of mitigation lands in fee title in Blaine County, Nebraska, which will exceed the HCP's mitigation requirement (i.e. 500 acres). This parcel is a continuous tract of land that has documented ABB presence along the entire tract. NPPD has completed two years of ABB surveys along public roads adjacent to these mitigation lands. ABB densities on portions of the property are within the upper 10 percent of densities documented in the Service ABB database. NPPD, in conjunction with the Service and NGPC, will develop a management plan for the mitigation parcel that will address land uses, such as grazing, haying, controlled burning, etc. that will be utilized to maximize ABB density on the parcel. NPPD will implement this plan and maintain the property in its current grassland land cover; by providing this habitat for ABB in perpetuity, NPPD will offset impacts of the R-project.

In addition to these mitigation lands, NPPD will restore temporarily disturbed ABB habitat in the R-Project permit area to its previous vegetation condition after construction is complete; in conducting this restoration, they will follow the procedures described in the R-Project Restoration Management Plan. The goal of the Restoration Management Plan is to meet the restoration success criteria for the restoration of ABB habitat within five years post-construction. To ensure restoration is successful, NPPD will establish an escrow account with a banking association to serve as a financial guarantee that there is money available to restore temporary disturbance areas if NPPD fails to take the appropriate steps to do so.

Monitoring and Adaptive Management Measures

- Annual ABB population monitoring will be conducted each August at the same 79 trap locations (discussed below) originally established for the August 2016 survey (as further described below in Status of the Species within the Action Area). Surveys will be

completed each August until the completion of construction activities.

- There will be on-site compliance monitors to ensure that avoidance and minimization measures, such as the use of low-ground-pressure equipment and the avoidance of sensitive environmental areas, are followed during construction activities.
- Compliance monitors will ensure that construction personnel do not violate disturbance boundaries and that the total disturbance (permanent and temporary) to ABB habitat associated with covered activities will not surpass the anticipated acres.
- Compliance monitors will ensure that construction personnel follow the Access Plan.
- Compliance monitors will ensure that vegetation is maintained at a height of less than eight inches and that carrion is removed from agreed upon locations.
- Effectiveness monitoring will be implemented to evaluate post-construction restoration effectiveness. If performance standards are not met within the initial five-year monitoring period, adaptive management measures will be implemented and post-construction restoration effectiveness monitoring will be extended until the standards are met.
- All reports and memos will be submitted to the Service.

Reporting

NPPD will submit an annual report to the Service by December 31 of each year during the life of the ITP. Annual reports will include:

- Brief summary or list of covered activities accomplished during the reporting year, including construction activities and operations and maintenance activities.
- Disturbances (i.e., number of acres disturbed by covered activities).
- Description of potential ABB take that occurred based on disturbances incurred that year. If take authorized by the ITP is exceeded, Service and NGPC will be notified immediately, even before the 31st of December.
- Brief description of conservation plan implementation, including avoidance and minimization measures implemented as well as conservation lands set aside.
- Compliance and Effectiveness monitoring results.
- Description of circumstances that made adaptive management necessary and how it was implemented, if applicable.
- Description of any changed or unforeseen circumstances that occurred and what was done to deal with those circumstances.
- Funding expenditures, balance, and accrual.
- Description of any minor or major amendments.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Status and Distribution

The ABB was listed as endangered on July 13, 1989 (54 FR 29652; Service 1989, entire) based on a drastic decline and extirpation over nearly its entire range. The Service prepared a recovery plan in 1991 (Service 1991, entire) and a Species Status Assessment Report in 2019 (SSA report; Service 2019). On May 3, 2019, the Service published a proposed rule and 12-month petition finding to reclassify the ABB from endangered to threatened with a 4(d) rule (84 FR 19013). The Service has not designated critical habitat for this species. During the 20th century, the

ABB disappeared from over 90 percent of its historical range (Lomolino et al. 1995, p. 606) which covered most of temperate eastern North America. The species was formerly distributed throughout 35 states and three Canadian provinces (Ratcliffe 1996, p. 60) but is believed to be extirpated from all but nine states in the U.S. and likely from Canada. The ABB is now known to occur in portions of Arkansas, Kansas, Oklahoma, Nebraska, South Dakota, Texas (not documented since 2008), on Block Island off the coast of Rhode Island; and reintroduced populations on Nantucket Island off the coast of Massachusetts and in southwest Missouri. Figure 2 shows the current range of the ABB. The Species Status Assessment Report defined populations as analysis areas based on broad geographic and ecological patterns to use in the evaluation of the species (Service 2019, pp. 21–23). Reintroduction efforts are also underway in Ohio, but survival of reintroduced ABBs into the next year (successful over-wintering) has not been documented. A potential report of an ABB in Michigan in 2017 is being investigated to determine if the area supports ABBs (Service 2019, p. 7).

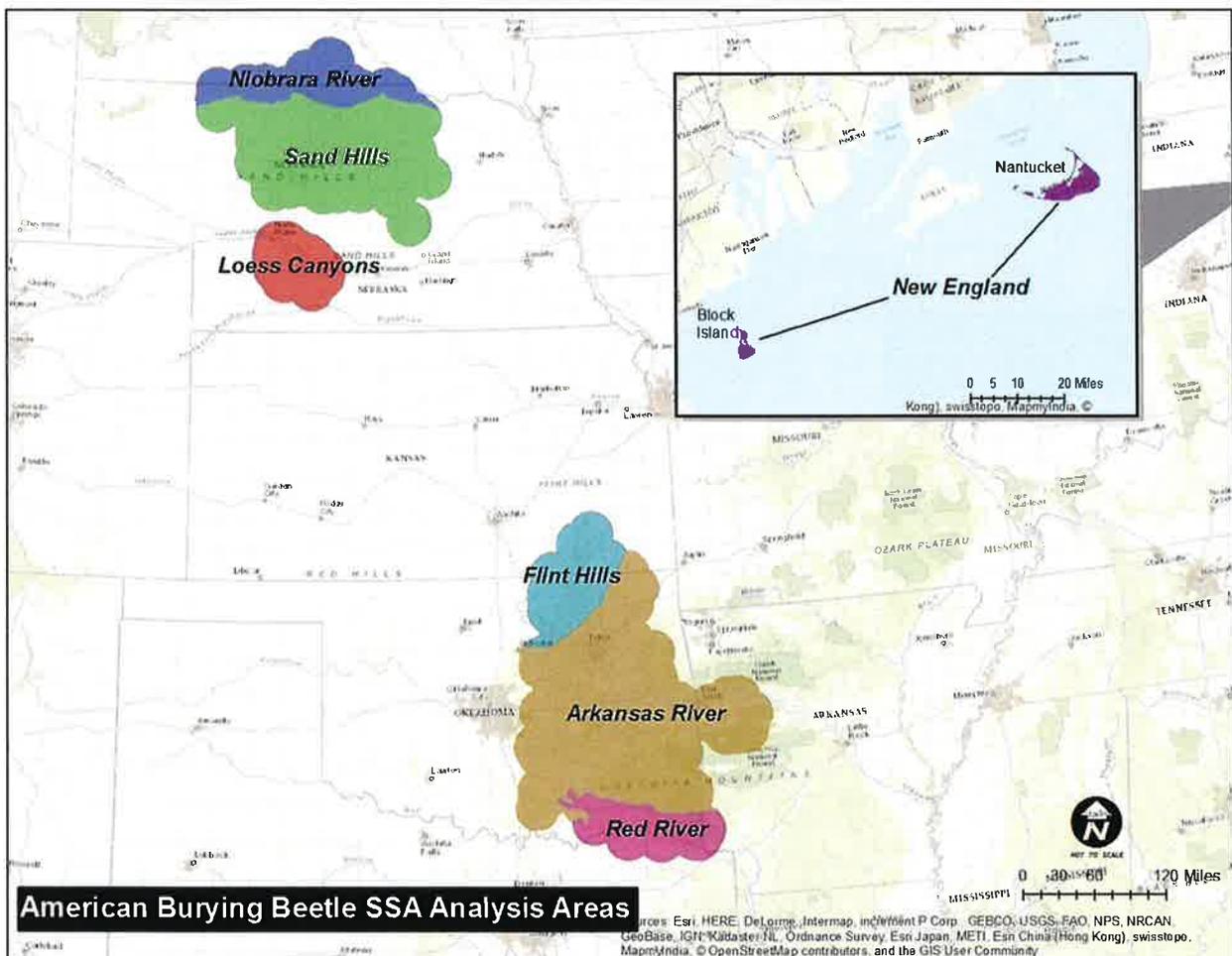


Figure 2. American burying beetle analysis areas for the species status report showing distribution of the species

Due to the severity of the decline and uncertainty regarding the causes, the recovery actions in the recovery plan focused on preventing the extinction of the species rather than developing actions and criteria for recovery. Recovery criteria were developed for downlisting, not for recovery. The objectives of the recovery program are: (1) Reduce the immediacy of the threat of extinction to the ABB and (2) improve its status so that it can be reclassified from endangered to threatened (Service 1991, p. 31). The Service's 2008 five year status review found that the ABB should remain as endangered because threats to the species had not been abated sufficiently to show that the ABB is no longer in danger of extinction (Service 2008, p. 35). Even though additional populations have been discovered since its listing, the ABB remains extirpated from approximately 90 percent of its historic range (Service 2008, p. 35). In 2019, the Service published a proposed rule to reclassify the ABB from endangered to threatened, based on a thorough review of best available science and commercial information, which indicated that the threats to the species have been reduced to the point that it no longer meets the definition of an endangered species under the Act, but is likely to become endangered within the foreseeable future (84 FR 19013).

The populations in Nebraska/South Dakota, Kansas/Oklahoma, Oklahoma/Arkansas, and central Arkansas were all estimated to be greater than 1,000 individuals in 2005 with a total estimated rangewide population of approximately 50,000 individuals (Amaral et al. 2005, p. 37). However, populations of the ABB fluctuate annually due to the weather, carrion availability, and other factors; thus, these population estimates have little utility unless managers conduct consistent surveys over the course of several years so that we can evaluate trends (Service 2008, p. 14). Such rangewide surveys are not currently conducted for this species and we have limited information by which to measure ABB population abundance (Service 2019, p. 71). Jurzenski et al. (2011, pp. 137-138) also noted that it is necessary to carefully interpret mark and recapture data due to the assumptions that emigration and immigration do not occur and that all individuals are available for recapture during the sampling timeframe. For the above reasons, the Service used the ratio of positive to negative ABB surveys to determine ABB relative abundance in the population analysis areas, rather than population estimates (Service 2019, p. 71).

Threats

The ABB Recovery Plan (Service 1991, pp. 18-24) and the five-year status review of the species (Service 2008, p. 26) identify the following factors as potential threats to the ABB: disease/pathogens, DDT/pesticide use, artificial lighting, habitat loss and fragmentation, interspecific competition, increase in competition for prey, increase in edge habitat, decrease in abundance of prey, loss of genetic diversity in isolated populations, agricultural and grazing practices, and invasive species. The conservation community has discussed several theories over the years on the cause of ABB's decline; however, we still do not know why the ABB declined while congeneric species are still relatively common rangewide.

Habitat fragmentation and an increase in edge habitat is the predominant theory regarding the cause of the ABBs' decline (Service 1991, p. 20). Fragmentation changed the species composition in ABB habitat, lowered the density of indigenous prey species and resulted in increased competition for prey (mammals and birds) with vertebrate scavengers (Ratcliffe 1996, p 64; Amaral et al. 1997, p. 124; Bedick et al. 1999, p. 179). Adults and larvae depend on dead

animals (carrion) for food, moisture, and reproduction. Although much of the evidence suggesting the reduction of carrion resources due to habitat change as a primary mechanism driving the decline of the ABB is circumstantial, this hypothesis fits the temporal and geographical pattern of the disappearance of ABBs; and, is sufficient to explain why ABBs declined while related species did not (Service 2019, p. 174). Some remaining populations have risks associated with areas of urban development, but most current ABB populations are in rural areas and have potential risks associated with soil disturbance activities. Risks associated with the effects of changing climate, including increasing temperatures, are now a significant threat for some analysis areas (Service 2019, p. 50).

Reproduction/Active Periods

The ABB is a nocturnal species (Service 1991, p 11) that lives for only one year (Bedick et al. 1999, p. 178). ABBs emerge from their winter inactive period when ambient nighttime air temperatures consistently exceed 59° F (15 °C) (Kozol 1988, p. 11; Kozol 1990, p. 4; Bedick et al. 1999, p. 179; Service 2008, p. 13). Typically, ABBs are active from May through September in southern portions of their range, but in more northern latitudes of their range, the active period is typically June through August (Service 2019, p. 10).

Reproduction occurs in the spring to early summer. ABB's require vertebrate carcasses of sufficient size (80-200g) for breeding (Holloway and Schnell 1997, p. 145). New adult ABBs or offspring (called tenerals), usually emerge in summer, over-winter (hibernate) as adults, and comprise the breeding population the following summer (Kozol 1988, p 2; Amaral et al. 2005, pp. 30, 35).

Feeding

Individual ABBs must fly to find food, a mate, and an appropriate sized carcass on or near suitable soils for burial (Service 2019, p. 11). When not involved with brood rearing, adults' food sources can include selection of an array of available carrion species and sizes, as well as feeding through capturing and consuming live insects (Service 1991, p. 11). In a lab, the ABB was attracted to both avian and mammalian carcasses (Kozol et al. 1988, p. 170), reptiles, amphibians, and fish (Bedick et al. 1999, p. 174).

Habitat

The ABB is considered a generalist in terms of the vegetation types where it is found, as it has been successfully live-trapped in a wide range of habitats, including wet meadows, partially forested loess canyons, oak-hickory forests, shrub land and grasslands, lightly grazed pasture, riparian zones, coniferous forest, and deciduous forests with open understory (Walker 1957, entire; Service 1991, pp.14-17; Service 2008, pp.8-11; Creighton et al. 1993, entire; Lomolino et al. 1995, entire; Lomolino & Creighton 1996, entire; Jurzenski 2012, pp.47-72; Willemsens 2015, pp. 5–6). Individuals do not appear to be limited by vegetation types as long as food, shelter, and moisture are available; ABBs have been recorded moving between and among these habitat types (Holloway and Schnell 1997, entire; Creighton and Schnell 1998, entire). Trapping success was higher at sites where small mammals were abundant (Holloway and Schnell 1997, p. 151). The Service believes that preserving large areas of suitable habitat is a conservation strategy that contributes to maintaining viable ABB populations (Service 2014, entire).

A more detailed life history account of the ABB is on our website:

https://www.fws.gov/southwest/es/oklahoma/Documents/ABB/Listing/ABBSSA_Final_V1.0_Feb2019.pdf

ENVIRONMENTAL BASELINE

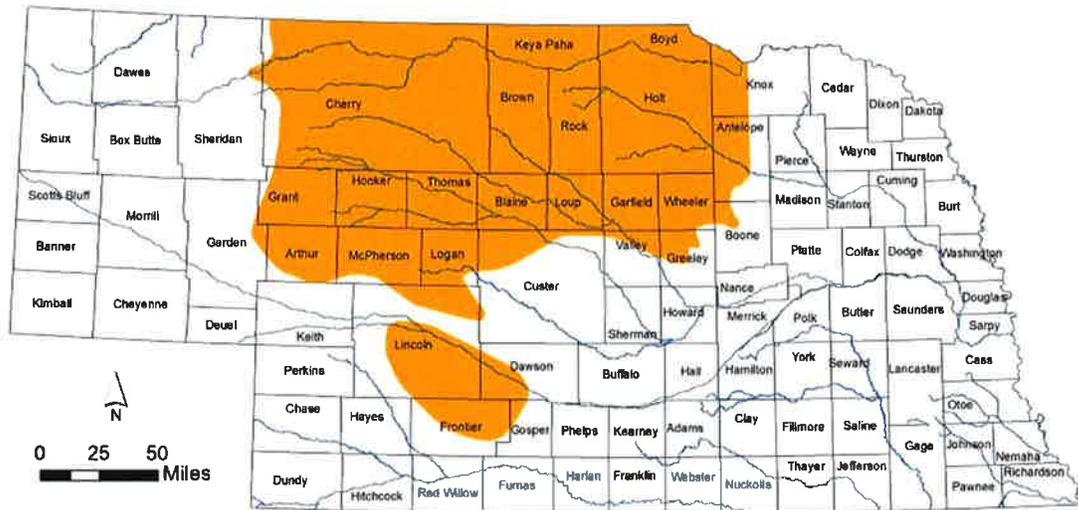
The environmental baseline includes past and present impacts of all federal, state, or private actions in the Action Area; the anticipated impacts of all proposed Federal actions in the Action Area that have undergone formal or early section 7 consultation; and, the impact of state and private actions that are contemporaneous with the consultation process. The environmental baseline defines the species' current status and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Species within the Action Area

In Nebraska, the ABB currently occurs in two distinct areas (Figure 3). In Amaral (2005, p. 27) these populations are described as the southern population centered in Lincoln and Dawson Counties known as “Loess Hills” and a second population in north central part of the state centered in Rock, Loup, Blaine, and Brown Counties and extending north into South Dakota. The 5-year status review also discusses these two discrete areas but uses “Sand Hills” to describe the geographically larger ABB population in north central Nebraska (Service 2008). The SSA Report identifies three analysis areas in Nebraska: Loess Canyons, Sand Hills, and Niobrara River (Service 2019, pp. 22-23). The Loess Canyons is the same as the Loess Hills population described in the earlier reports. However, the larger northern population described in those earlier reports was separated into two areas with the Niobrara River serving as the boundary between the two: “Sand Hills” analysis area (Sandhills analysis area) and “Niobrara River” analysis area.

The permit area falls within the Sandhills analysis area described in the SSA Report (Service 2019, entire). Approximately 8,633,685 acres of potential ABB habitat occurs in the Sandhills analysis area, including favorable, conditional, and marginal land cover types (Service 2019, p. 63). The Sandhills analysis area has the highest ratio of positive to negative surveys of all ABB analysis areas. Future land use changes are not expected to impact relative abundance of ABBs in the Sandhills analysis area (Service 2019, p. 119). Amaral (2005, p. 75) used survey results to estimate a population of 10,000 ABBs within 1,000 square miles of potentially suitable habitat in the Sandhills (north central Nebraska and extending into South Dakota). Panella (2013, p. 2) indicates that since 2005 the trend of the ABB population in Nebraska is “fluctuating with drought.”

Estimated Current Range of American Burying Beetle (*Nicrophorus americanus*)



The Sandhills portion of this range was based largely on a distribution model created using data collected from 2001 through 2011 by various government and non-government organizations. Logistic regression was used to predict probability of occurrence of American Burying Beetle based on data collected in the Sandhills and a number of climate, soil, and land cover variables. The model was created by The US Fish and Wildlife Service, University of Nebraska Kearney, Rainwater Basin Joint Venture, and Nebraska Game and Parks Commission. The Sandhills probability model and range map was combined with other known distribution data to create the overall range map shown here. Work is being undertaken to create comparable models outside of the Sandhills.

Map produced by the Nebraska Natural Heritage Program, Nebraska Game and Parks Commission, March 2014.

Figure 3. Estimated Current Range of ABB in Nebraska (NGPC 2018)

In Section 5.3 of the HCP, NPPD used two methods to calculate a population estimate within the permit/action area: (1) a probability of occurrence model and (2) mark/recapture study. Jorgensen et al. (2014, entire) completed a model to predict the probability of occurrence for ABB throughout the Sandhills. To interpret the model results, Jorgensen et al. (2014, entire) suggests that a probability of occurrence greater than or equal to 60 percent are locations where ABB “does occur,” areas with a probability of occurrence between 15 percent and 60 percent are locations where ABB may “potentially occur,” and areas with a probability of occurrence lower than 15 percent are locations where ABB are absent. Based on this probability level, the Jorgensen et al. (2014, entire) model assumes that beetles occur on 5,574,357 acres of habitat in the Sandhills. Applying a median beetle density calculated from historic trapping data (0.01 beetles per acre) to the Sandhills acreage, the HCP estimates the beetle population in the Sandhills to be about 55,743. Using the model prediction of 503,963 acres of ABB habitat in the permit area, NPPD estimated that 5,039 ABB may be present within the permit area in a year with a median ABB population.

In August 2016, NPPD began annual monitoring using a large-scale protocol-level mark/recapture survey that included 79 traps spread throughout the permit area. This survey effort was completed on the same days in early August in 2016, 2017, and 2018 (NPPD 2016). ABB were captured each year throughout the east-west portion of the R-Project. NPPD

calculated a population estimate using the Schnabel Method. Under the Schnabel Method, biologists conduct sampling events multiple times. Each survey effort notes the number of individuals captured, records the number of individuals recaptured cumulatively, and marks all the new captures. A summary of survey results and population estimates are provided in Table 2 and the locations of the mark/recapture surveys are in Figure 4.

Table 2. Results of ABB Monitoring: 2016, 2017, and 2018

Survey Area	Individual ABB Captured		
	2016	2017	2018
Hwy 83	0	0	0
Purdum	2	3	0
Brewster	99	46	77
Hwy 7	118	49	27
Calamus River	63	8	43
Gracie Creek Rd	23	23	33
Hwy 11/846 Rd	122	74	30
846 Rd	64	91	17
TOTAL	491	294	227
Survey Area Population Estimate	1,281	714	1,017

1. Population estimate reflects the estimated ABB population for the area surveyed each year as calculated using the Schnabel Method of mark/recapture surveys.

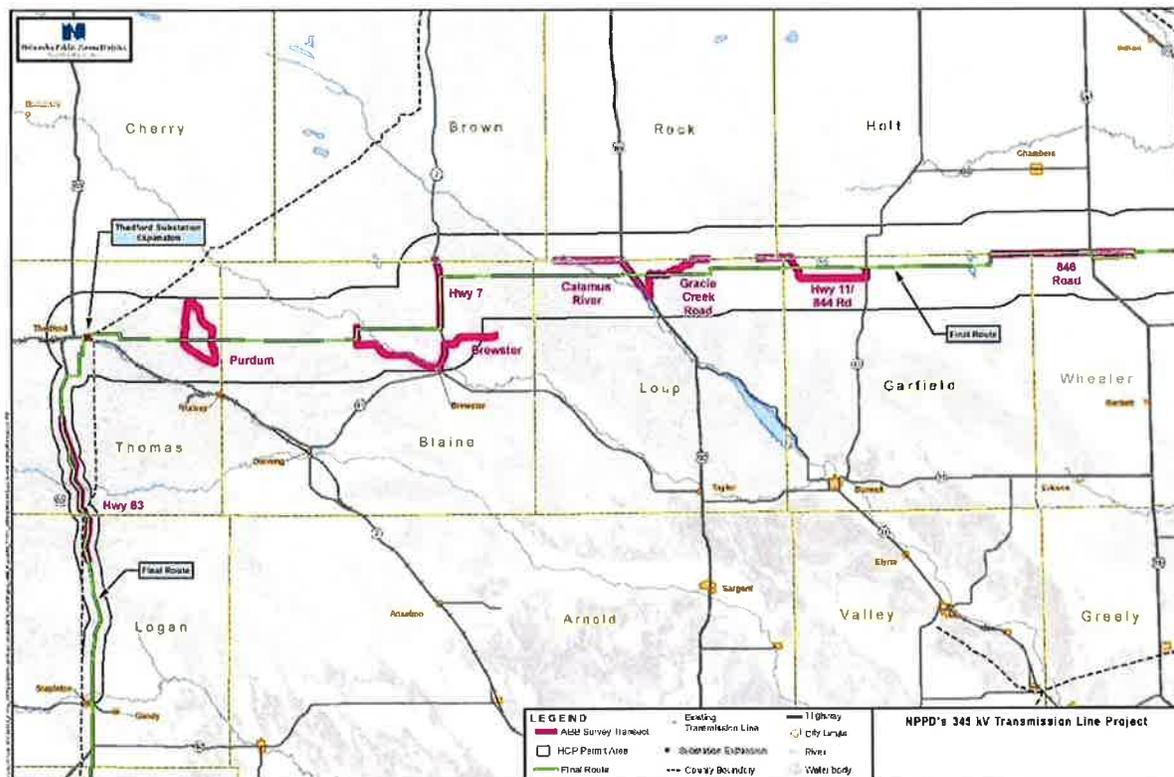


Figure 4. ABB Mark/Recapture Surveys

Using a mark/recapture population estimate derived from the 2016, 2017, and 2018 survey results, NPPD estimated ABB populations within the 39,500 acres surveyed each year (Table 3). NPPD also estimated the ABB population within the permit area for each year surveyed; these estimates ranged from approximately 9,000 to 16,000 individuals (Table 3).

Table 3. Annual ABB Mark/Recapture Population Estimates

Survey Year	Estimated ABB Population – Survey Area	Estimated ABB Population – Permit Area
2016	1,281	16,125
2017	714	9,071
2018	1,017	13,103

Factors Affecting Species Environment within the Action Area

In the north-central and southwest-central portion of Nebraska, Panella (2013, p. 2) lists eastern red cedar encroachment, drought, land development, light pollution, and scavengers as threats to the ABB. The predominant land use in the permit area is grazed grassland and irrigated cropland (Service 2018, p 3-252). Nebraska has lost native prairie rangeland where ABB are found through its conversion to cropland. Most of the potential conversion of ABB habitat to cropland requires irrigation in Nebraska and South Dakota analysis areas. Increased irrigation or other uses of ground water are a risk if they exceed recharge rates and lower the water table.

Declining aquifer levels would threaten the habitat suitability in the Sandhills because soil moisture is maintained by water tables that are relatively near the surface (Service 2019, p. 64). Additionally, developed and converted land leads to declines in grassland nesting birds and rodents, which probably historically provided a large portion of the carrion available to the ABB. Fire suppression in prairie habitats in Nebraska allows the encroachment of woody plant species, particularly the eastern red cedar, which is thought to degrade habitat for burying beetles by limiting their ability to forage for carrion (Walker and Hoback 2007, p. 297). Wind energy development has increased in recent years and may become a larger risk in the future (Service 2019, p. 64).

Climate Change

Climate has always limited the ABB range to some degree. Populations at the northern edge of the historic range were limited by cool night time temperatures and shorter growing seasons and could potentially expand north as climates warm. However, there are no current populations near the northern edges of the historic range and habitat limitations may prevent existing populations from moving north (Service 2019, p. 44). Within the Great Plains, including Nebraska, average temperatures have increased and projections indicate this trend will continue over this century (Shafer et al., 204, pp. 442–445). Future precipitation is much more challenging to model and therefore projections of it have more uncertainty as compared to temperature (Service 2019, p. 39).

Climate change could affect habitat suitability and potentially reduce or expand ABB use of portions of the Sandhills. Increasing temperatures and dryer conditions potentially associated with climate change could cause reductions in the species' reproduction and numbers. Similarly, milder winters could disrupt hibernation cycles if freezing temperatures occur later in the year or if temperatures consistently reach 55°F to 60°F earlier in the year. Portions of the Sandhills are

near the northern and western edge of the known ABB range and changes in temperature and moisture could affect suitable habitat in future years (Service 2019, p. 64). ABBs in the Sandhills may have a longer time period for potential reproduction than ABBs in the southern portion of their range. ABBs in the Sandhills could emerge from over wintering by late May or June and be ready to reproduce at that time. From June to August, ABBs could have suitable conditions for reproduction in northern areas and that timeframe could be nearly twice as long as the southern portion of the ABB range (Service 2019, pp. 47–48).

Climate change also has the potential to affect habitat availability through changes in land uses (Service 2019, p. 48). The National Climate Assessment was conducted by region with Nebraska being a part of the Great Plains Region, and within that report, Shafer et al. (2014, p. 446) noted that rising temperatures in the Great Plains may increase human competition for water. Increased temperatures in the Great Plains states could lead to earlier spring snowmelt, decreased snowmelt season duration, and decreased peak snowmelt flows (Bathke et al. 2014, p. 26). Increased temperatures would also result in decreased soil moisture due to increased evapotranspiration from vegetation that breaks dormancy earlier. Drought frequency and severity would increase in Nebraska due to increased temperatures and expected seasonal variability in precipitation (Bathke et al. 2014, p. 33). Increased temperatures could increase water demands and usage for irrigation and potentially lower groundwater levels in aquifers (Service 2019, p. 48). Also, increased temperatures and longer droughts may increase the percentage of pastures that are heavily grazed or increase the demand for hay and encourage more cuttings (Service 2019, p. 48).

Habitat conditions, population abundance, and distribution are all likely to be affected by climate changes. The Service analyzed impacts of climate change to populations in the northern plains, which includes the Sandhills, in the SSA Report (Service 2019, entire). Under moderate emissions levels, populations in all northern plains areas should be maintained through 2099, but some reductions in abundance and distribution are possible as temperatures approach the temperature threshold levels. Under high emissions level, potential extirpation is likely for all of the northern plains areas by 2070–2099 under the high emissions level (Service 2019, p. 162).

EFFECTS OF THE ACTION

Effects of the action are defined as the “...*direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline.*”(50 CFR §402.02) (emphasis added).

Effects of the action are a reasonable prediction of the likely response by individuals of a species to and the resulting biological effects from the environmental changes brought about by implementation of the chosen proposed action. As noted previously, the Federal action under consideration is approval of the HCP and issuance of an ITP for incidental take of ABBs associated with the R-Project. The effects of the action to the species will occur through the implementation of the HCP and the issuance of the ITP for the permit term. Effects to ABB

from implementing the HCP and issuance of the ITP include mortality or injury due to operation of construction equipment, temporary and permanent loss of habitat, fragmentation of habitat, degradation of habitat through lighting, and temporary disruption of behavior.

Crushing and desiccation of individuals - An effect to ABB is the loss of individuals, including eggs and larvae in brood-rearing chambers, due to mortality caused by crushing from construction equipment. Removal and physical alteration of vegetation and soil during excavation and grading may crush ABB resulting in injury or mortality. Covered activities that will not physically alter soils but include the repeated use or parking of heavy equipment may still cause mortality and injury by crushing or preventing the escape of buried ABB.

Covered activities involving physically altering soils may expose ABB adults, larvae, and eggs, which may result in desiccation, leading to injury or mortality. For the purposes of this analysis, it is assumed that any ABB occupying an area physically disturbed by covered activities will suffer mortality via crushing from construction equipment or desiccation as a result of exposure. It is unlikely that ABB would use any temporarily disturbed areas after the initial disturbance. Therefore, ABB would not be at an elevated risk of crushing or desiccation from the repeated use of a temporarily disturbed area by construction equipment.

Habitat disturbance/loss - Covered activities during construction will result in the temporary disturbance of 1,042 acres and conducting covered emergency repair activities in the future could temporarily disturb an additional 208 acres (Table 1). The impact of temporary disturbance from construction compared to the acres of available ABB habitat in the Sandhills is shown in Table 4. Covered activities for site preparation, foundation installation, structure erection, and potentially pulling and tensioning will likely affect two ABB generations, all at the same location. Habitat removed during site preparation would not be returned to ABB habitat until all construction activities are completed at that location. Permanent loss of habitat from the covered activities is 33 acres. Breeding, feeding, and sheltering activities will be affected by any activities that occur in the active season. Prey and carrion availability are likely to be affected by the temporary and permanent loss of habitat since prey will move out of the disturbed areas and not return until those temporarily disturbed areas are restored.

Fragmentation of habitat - The majority of access routes will be temporary and will be restored to their previous habitat condition upon completion of construction. Meeting the success criteria for restoration may take up to five years following completion of construction activities. However, prior to the completion of this restoration, temporary access routes may result in the short-term fragmentation of ABB habitat. Vertebrate scavengers (i.e., American crows, skunks, raccoons) that compete for prey sources may use these temporary access routes as travel corridors into unfragmented grassland habitat, thus increasing competition for ABB until the disturbed areas are restored. However, once revegetated, temporary access routes will not present a permanent travel corridor for vertebrate scavengers into grassland habitats, thereby eliminating this potential form of competition.

Degradation of habitat from lighting - Covered activities may occur in limited instances at night and will require some form of artificial lighting. ABB, like many insects, are attracted to artificial lighting (Service 1991, p. 29). This attraction to lighted construction areas may disrupt

normal ABB feeding behavior or increase the risk of predation by attracting individuals to areas unsuitable for ABB use. ABB would be attracted to artificial lighting only during the active season of June through August (Service and NGPC 2008, entire). However, to minimize effects during the active season, construction activities will be completed during the daytime to the maximum extent possible. In the rare instances when nighttime work may be required during the active season, sodium vapor and downshield lighting would be used. We anticipate that these minimization measures will limit the likelihood of attracting ABB's to the active construction areas and that any effects from lighting will be temporary and short in duration. Permanent lighting of structures within the permit area is not proposed.

Temporary disruption of behavior - Increases in human activity, vehicle traffic, and noise as a result of covered activities may cause ABB to avoid areas occupied by construction personnel and equipment that may otherwise be present in suitable habitat. ABB avoidance of construction personnel and equipment is expected to be temporary. Further, it is expected that ABB would continue to utilize adjacent habitats during the temporary disturbance. Temporary avoidance of limited areas of habitat is expected to have no effect on ABB given the abundance and availability of habitat throughout the Sandhills.

Operation and Maintenance - Routine operation and maintenance activities will not result in the take of ABB due to the proposed avoidance and minimization measures that NPPD will implement. However, emergency repairs may be completed at any time of the year, including the ABB active season, and may include the use of any equipment necessary to complete the repair. Effects from 208 acres of temporary disturbance to habitat associated with emergency repairs within the permit area would be similar to those described for construction under Crushing and Desiccation of Individuals and Habitat Disturbance. Emergency repairs will not likely require the physical alteration of soils, but may require the use of equipment that could crush buried ABB. Emergency repairs would employ avoidance and minimization measures when the situation allows. However, some situations, such as storm-related line failure, may require NPPD to act quickly to restore power. In these instances implementation of avoidance and minimization measures may not be feasible.

Interrelated and Interdependent Actions

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. The Service is not aware of activities interrelated to or interdependent with the proposed action at this time.

Species Response to the Proposed Action

The anticipated disturbance to the ABB habitat includes temporary (1,250 acres) and permanent (33 acres) impacts as a result of the proposed covered activities over the 50 year life of the ITP. The Restoration Management Plan will ensure that the temporary impacts to habitat are restored to provide suitable habitat for the ABB and its prey within 5 years post construction.

Table 4 provides a summary of how the impacts to habitat from this project compare to available habitat in the Sandhills.

Table 4. Temporary and Permanent Disturbance from construction Compared to Available ABB Habitat

GEOGRAPHIC AREA	ACRES DISTURBANCE		ACRES OF AVAILABLE ABB HABITAT	% DISTURBED HABITAT	
	PERMANENT	TEMPORARY		PERMANENT	TEMPORARY
Permit Area	33	1,250	503,963 (calculated using Jorgensen et al. 2014, entire, as described in NPPD 2018a, p. 109)	0.0065%	0.25%
Sandhills Estimated Occupied Range	33	1,250	5,574,357 (calculated using Jorgensen et al. 2014, entire, as described in NPPD 2018a, p. 109)	0.00059%	0.022%
ABB potential habitat in Sandhills analysis area	33	1,250	8,633,685 (Service 2019, p. 63; includes favorable, conditional, and marginal land cover types)	0.00038%	0.014%

Incidental take of the ABB is based on the amount of ABB habitat impacted from the R-Project. Because NPPD was unable to access all private lands and assign habitat ratings along the entire route, NPPD assumed that all acres the R-Project will disturb are ABB habitat and present equal high-quality value to ABBs. Total incidental take of ABB from the R-Project was calculated by multiplying the area of ABB habitat impacted (acres) by an estimated ABB density (ABBs per acre) (Table 5).

R-Project construction and emergency repairs will disturb an estimated 1,283 acres within the permit area. Temporary (1,250) plus permanent (33) impacts total 1,283 acres. The estimated ABB density was 0.13 ABBs per acre (see further discussion of the ABB density calculation below). The total incidental take is estimated at 167 ABBs (1,283 acres X 0.13 ABBs per acre) for construction and emergency repair of the R-Project over the 50-year ITP duration.

The ABB density estimate of 0.13 ABBs per acre was calculated using the following information:

- Extensive ABB surveys have been conducted within the permit area for the R-Project and the surrounding area in the Sandhills of Nebraska. These surveys are typically conducted for proposed development projects, including roads, urban development, and energy infrastructure. Researchers and consultants with a Service Research and Recovery Permit conduct the ABB surveys and the Service maintains survey results in a database.
- ABB populations fluctuate annually based on climate factors including precipitation and temperature. To account for this fluctuation in the incidental take estimate, NPPD and the Service incorporated numerous years of historic ABB survey results from a larger spatial area in the Sandhills of Nebraska.

- ABB survey results from 1996 through 2016, including NPPD’s ABB surveys of the R-Project from 2014, 2015, and 2016, were used to estimate density of the ABB. The permit area is within an area with extensive existing trap data. These data are typically collected for proposed development projects, including roads, urban development, and energy infrastructure, and are not uniformly distributed across the counties included here. Because development projects typically occur along existing access, and for ease of completing large survey transects, the majority of traps were placed along existing roads.
- To ensure that the data used to calculate the take estimate only represents high-quality habitat, only those traps with at least six unmarked ABBs captured across a standardized 5-night sampling effort in the Service database (1996 through 2016) were used. All survey points with less than a 5-night sampling period were removed and surveys with more than five nights were standardized by multiplying the average ABBs per trap night by five.
- The habitat assumption (as discussed above) and database screening criteria yielded a set of data for analysis consisting of 299 ABB survey points. Based on the above screening criteria, it is assumed that the data set is composed almost exclusively of ABB surveys conducted within good to prime habitats in the Sandhills of Nebraska.
- Individual densities for each trap were calculated by dividing the number of ABBs captured in each trap by the effective trap area (500 acres) and then adjusting for a capture efficiency of 90 percent (rounded up from 89.4; Butler 2011, p. 82). Because of the annual ABB population fluctuation and to reduce risk of underestimation, the take estimate was based on the 99th percentile data point of these ABB density calculations; this resulted in a density estimate of 0.13 ABBs/acre.

Table 5. Anticipated Take from Covered Activities Associated With Construction, and Emergency Repairs during Operation and Maintenance

COVERED ACTIVITY	ESTIMATED PERMANENT AND TEMPORARY DISTURBANCE (ACRES)	ESTIMATED ABB DENSITY PER ACRE	ABB ANTICIPATED TAKE NUMBERS
CONSTRUCTION			
Access			
Temporary Access Scenario 2	192	0.13	25
Permanent Access Scenario 3 ¹	19	0.13	2
ROW Preparation			
ROW Tree Clearing ²	29	0.13	4
Temporary Work Areas			
Fly Yards/Assembly Areas	156	0.13	20
Construction Yards/Staging Areas	82	0.13	11
Pulling and Tensioning Sites	192	0.13	25
Temporary Structure Work Areas			
Lattice Tower	129	0.13	17

COVERED ACTIVITY	ESTIMATED PERMANENT AND TEMPORARY DISTURBANCE (ACRES)	ESTIMATED ABB DENSITY PER ACRE	ABB ANTICIPATED TAKE NUMBERS
Steel Monopole	219	0.13	28
Permanent Structure Foundations			
Lattice Tower	0.61	0.13	0.079
Steel Monopole	0.25	0.13	0.032
Distribution Power Line Relocation			
Distribution Power Line Relocation	43	0.13	6
Well Relocation			
Well Relocation	0.4	0.13	0.052
Substation			
Thedford Substation	13	0.13	2
Construction Subtotal	1,075	--	140
OPERATION AND MAINTENANCE			
Emergency Repairs ³	208	0.13	27
TOTAL	1,283	--	167

¹Temporary access routes under Access Scenario 2 may be left in place following completion of construction depending on landowner requests and requirements for operation and maintenance of the line. These routes would then be classified as Access Scenario 3 and represent a permanent impact. No more than 10% (19 acres) of Access Scenario 2 will be left in place following construction.

²Trees will not be allowed to re-grow within ROW. ROW would be converted to grassland.

³Disturbance from emergency repairs is estimated at 20% of the total estimated temporary disturbance from construction within the permit area. Disturbed acres would be restored if conditions require restoration efforts.

CUMULATIVE EFFECTS

Cumulative effects “...are those effects of future State, tribal, local, or private activities, not involving Federal activities that are reasonably certain to occur in the action area of the Federal action subject to consultation.” Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

One project purpose of the R-Project is to provide additional opportunities for future renewable energy projects. If proposed, these projects would be likely to occur under certain specific circumstances. They would be in areas with suitable wind resources that are close enough to be connected to the R-Project, and these projects would require property owners that are willing to sell or lease their lands for such purposes. While future projects have the potential to impact ABB habitat, the intensity of impacts and whether or not it causes effects to ABB would depend on the number of wind energy projects built, presence or absence of ABB at the site, geographic location, and other site and project-specific characteristics. If ABB were exposed to impacts, the resulting effects would also depend on the number and types of avoidance, minimization, and mitigation measures that would be implemented for each project.

For example, in the EIS, the Service identified the Thunderhead Wind Energy Project under the cumulative effects section as reasonably foreseeable. The information that we could find on this project indicates that Thunderhead is proposing 171 total turbine locations, 137 in Antelope

County and 34 in Wheeler County. The Wheeler County portion of the project is the only part of the proposed plan that may occur in the action area; however, we could not locate any detailed information on whether Wheeler County permits were issued, on the specific locations of the turbines, or on whether these turbines would be built in ABB habitat. While recognizing the potential for this project and other new wind energy projects in the action area, the Service knows of no projects reasonably certain to occur in the action area for which the Service has the level of detail necessary to identify and analyze specific effects. Any future projects built in potential ABB habitat would need to work with the Service to comply with the ESA.

CONCLUSION

The Service has analyzed and described the likely adverse effects to the ABB from issuance of the ITP resulting in the implementation of the HCP for the R-line Project. The purpose of our analysis was to assess the effects of this project when combined with the status of the species, the environmental baseline, and any identified cumulative effects in order to form an opinion as to whether this action would be likely to jeopardize the continuing existence of the ABB. The regulatory definition of likely to jeopardize is "...to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." (50 CFR 402.02)

Reproduction – We anticipate that habitat disturbances from R-Project activities during the construction period (approximately 21 to 24 months) would prevent ABB reproduction. Reproduction is not likely to resume until the disturbed habitat is successfully restored. When construction begins, all ABBs present would be killed, and ABBs would not colonize the area until restored habitat is suitable. Therefore, no reproduction would occur for 3 to 7 years in each area disturbed by construction. Once habitat is restored and prey re-inhabit the area, ABBs in nearby habitat would likely recolonize and begin reproducing. Areas temporarily disturbed by construction activities will be used more than one time by NPPD for various activities throughout the construction process and will not be restored until construction is complete. We do not expect ABBs to inhabit the disturbed areas during construction due to the lack of habitat and prey species. NPPD will stabilize, revegetate, and restore temporarily disturbed areas within 3 to 5 years after construction and establish an escrow account to ensure successful restoration. The ABB and other disturbed wildlife species, including prey species, are likely to return to the area following construction when personnel and equipment are no longer present and suitable habitat has been restored (within 3 to 7 years of initial disturbance).

Numbers – We estimated that 167 ABBs will be taken in the permit area for the duration of the ITP as a result of the covered activities (see Species Response to the Proposed Action). NPPD provided two estimates of ABB population numbers. The mark and recapture study estimated that the permit area contained approximately 9,000 to 16,000 ABBs, based on data between 2016 and 2018. Using the Jorgensen et al. (2014) model, NPPD estimated that 5,039 ABB may be present within the permit area. The population viability analysis by Amaral et al. (2005, p. 40) concluded that ABB populations of 1,000 or more individuals are viable long-term in the absence of severe catastrophic events or reduction in carrying capacity through a reduction in carcass availability, habitat loss, or fragmentation. Amaral et al. (2005, p. 38) indicates that

populations of greater than 10,000 ABB can persist even through catastrophic events. Amaral et al. (2005, p. 75) also estimated that the Sandhills beetle population to be about 10,000 beetles. NPPD estimated in section 5.3 of HCP that the Sandhills beetle population is about 55,743. The Service used the ratio of positive to negative ABB surveys to determine ABB relative abundance in population analysis areas (Service 2019, p. 71). The ratio of positive to negative ABB surveys in the Sandhills analysis area was defined as the highest condition category of “good,” with the highest ratio of positive to negative surveys compared to other analysis areas (Service 2019, p. 95). The R-Project will not impact the long-term persistence of the Sandhills ABB population because the 167 individuals we expect the project to take within the permit area represent only a small percentage of the estimated Sandhills population under either population scenario; this level of population loss does not represent a catastrophic event or a reduction in carrying capacity. With little to no impact on the Sandhills population, we do not expect there would be any effect on the rangewide population estimated by Amaral (2005, p. 37) to be approximately 50,000 individuals.

Distribution – The ABB is distributed throughout the permit area and much of the surrounding Sandhills. The majority of the impacts to habitat will be temporary (1,250 acres), while permanent loss of habitat will be 33 acres. Those temporary impacts represent approximately 0.022 percent of the estimated Sandhills occupied range. As discussed above, the temporarily impacted habitat would not be occupied by ABBs until the habitat is successfully restored 3 to 7 years later. Once restored habitat reaches suitability criteria, ABBs and their prey from nearby areas are likely to recolonize. Thus, distribution would change slightly due to this temporary disturbance until recolonization occurs; these aspects of the range would not be permanently affected. However, ABBs would not recolonize the permanently lost habitat areas. But, those 33 acres are scattered throughout the permit area and, even in totality, represent a small fraction of the occupied range of the ABB (i.e. 0.00038–0.00059% of the available ABB habitat in the Sandhills). Therefore, we do not anticipate any meaningful impacts to the ABB’s rangewide distribution.

Based on the rationale above, the described changes to the ABB’s reproduction, abundance, or distribution would have a negative effect on the ABB and its habitat but is not likely to reduce appreciably the likelihood of both the survival and recovery of this listed species in the wild. Therefore, it is the Service’s BO that the issuance of an ITP for NPPD’s covered activities in Nebraska is not likely to jeopardize the continued existence of the ABB.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is defined by regulation as “an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.” Harass is defined by regulation as “... an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not

limited to, breeding, feeding or sheltering.” Incidental take is defined as “takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant.” Under the terms of Section 7(b)(4) and Section 7(o)(2), such taking is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement (ITS).

The proposed R-Project HCP submitted by NPPD and its associated documents identify anticipated impacts to the ABB likely to result from take incidental to the proposed R-Project and the measures that are necessary and appropriate to avoid, minimize, and mitigate those impacts. All avoidance, minimization, and mitigation measures described in the HCP and section 10(a)(1)(B) ITP are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR §402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittee fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) ITP and section 7(o)(2) may lapse. The amount or extent of incidental take expected under the HCP, associated reporting requirements, and provisions for disposition of dead or injured ABBs are as described in the HCP and its accompanying section 10(a)(1)(B) ITP.

In addition to the responsibilities of the Applicant, the Service has the responsibility to monitor compliance with provisions of the HCP and to take appropriate steps if compliance is deficient.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The Service anticipates incidental take of ABBs will result from covered activities. Covered activities associated with construction will account for an estimated take of 140 ABB during construction of the R-Project. Covered activities associated with emergency repairs of the R-Project will account for an estimated take of 27 ABB. Other operation and maintenance activities would not result in take. Total incidental ABB take is 167 for construction and emergency repairs of the R-Project over the 50-year ITP duration. The incidental take is expected to be in the form of harm. Harm to the species may occur through activities that kill individual ABBs as well as those that alter the suitability of the habitat to support ABBs.

Annual ABB population compliance monitoring will be conducted each August at the same 79 trap locations originally established for the August 2016 survey. Surveys will be completed each August until the completion of construction activities. Results of these annual ABB surveys will be compared to the estimated take number in the HCP and ITP. Annual surveys will determine if ABB take will potentially exceed that estimated in the HCP and ITP.

EFFECT OF THE TAKE

In the accompanying opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the ABB or destruction or adverse modification of critical habitat. There is no critical habitat designated for the ABB.

REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

The HCP ITP contains all measures necessary to avoid, minimize, and mitigate incidental take of the ABB to the maximum extent practicable and requires that the HCP be fully implemented. Monitoring will be conducted as stated in section 6.3 of the HCP. Therefore, no additional reasonable and prudent measures and terms and conditions are necessary for the ABB.

Procedures for Handling and Disposing of American Burying Beetles

If a dead or impaired ABB is found, care should be taken in its handling to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. The dead or impaired ABB should be photographed prior to disturbing it or the site. The Service is to be notified within three (3) calendar days upon locating a dead or injured ABB. Initial notification must be made to the applicable Service Office of Law Enforcement for Nebraska at (316) 788-4474. Then the Nebraska Ecological Services Field Office at (308) 382-6468. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Formal written notification also must be submitted within seven (7) calendar days.

All dead or moribund adults should be salvaged by placing them on cotton in a small cardboard box as soon as possible after collection. The date and location of collection should be included with the container. Specimens should then be furnished to the repository identified by the appropriate Ecological Services Field Office for deposition in their collection of invertebrates, or to another suitable site approved by the Service.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

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