



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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Memorandum

To: Assistant Regional Director, Ecological Services Interior Region 6, Albuquerque, New Mexico, Attention: Marty Tuegel, Branch Chief Environmental Review
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Date: 2020.10.15 07:25:55 -06'00'

From: Division Chief, Environmental Review, Ecological Services, Interior Region 6

Subject: Intra-Service Section 7 Biological Opinion on Reclassifying the American Burying Beetle (*Nicrophorus americanus*) From Endangered to Threatened on the Federal List of Endangered and Threatened Wildlife with a 4(d) Rule, Final Rule

This document contains the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion), pursuant to section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*) This Opinion addresses the effects to the American burying beetle (ABB) resulting from the Service's finalization of a special rule under the authority of section 4(d) of the Act. It evaluates activities that the Service is excepting from take prohibitions under the final 4(d) rule. In this intra-Service consultation, the Service proposes a framework for streamlined section 7 consultation for other federal actions that may affect the ABB and are consistent with the provisions of the 4(d) rule. This is a programmatic intra-Service consultation, because it addresses multiple actions on a program basis conducted under the umbrella of the final 4(d) rule. The Service has not designated or proposed critical habitat for the ABB; therefore, this Opinion does not address effects to critical habitat.

We base this Opinion on the best available scientific and commercial data including the ABB Species Status Assessment Report (SSA Report), comments on the proposed rule, electronic mail and telephone communication with Service staff, Service files, websites, pertinent scientific literature, discussions with recognized species authorities, and other scientific sources. A complete record of this consultation is on file in the Oklahoma Ecological Services Field Office in Tulsa, Oklahoma.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

U.S Fish and Wildlife Service Action

Regulations implementing the Act (50 CFR 402.02) define “action” as “all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies of the United States or upon the high seas.” The following is a summary of the proposed action. A detailed project description may be found in the final rule.

Section 4(d) Rule Overview

The action evaluated in this Opinion is the Service’s finalization of a special rule under the authority of section 4(d) of the Act for the ABB. Section 9 of the Act generally prohibits the “take” of a species listed as endangered. Federal and non-Federal activities that result in prohibited take, as defined in the 4(d) rule, would receive take authorization through a project specific formal consultation with the Service and issuance of a biological opinion, pursuant to section 7 of the Act (Federal); or, through the issuance of a project specific incidental take permit, enhancement of survival permit, or research and recovery permit, pursuant to Section 10 of the Act (non-Federal). Therefore, this Opinion only evaluates activities that the Service is excepting from take prohibitions under the final 4(d) rule.

This 4(d) rule tailors the Act’s protections to except prohibited take related to activities that only have minor or temporary effects and are unlikely to affect the resiliency of ABB populations or viability of the species. Risks for ABB populations differ by geographic region, and risks that may be minor for one population could affect the resiliency of others. This Opinion has evaluated major categories of actions that may affect the ABB, but for which incidental take has been excepted from take prohibitions. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions. Federal agencies may rely on this Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the framework specified in this Opinion.

Action Area and Exceptions from Take Prohibitions

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 (50 CFR 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The “Action Area” for this consultation includes the entire range of the ABB within the United States (excluding reintroduction efforts in Missouri and Ohio), which includes the ABB analysis areas (see Figure 1) in portions of the following 8 States: Arkansas, Kansas, Oklahoma, Nebraska, South Dakota, Texas, Rhode Island and Massachusetts.

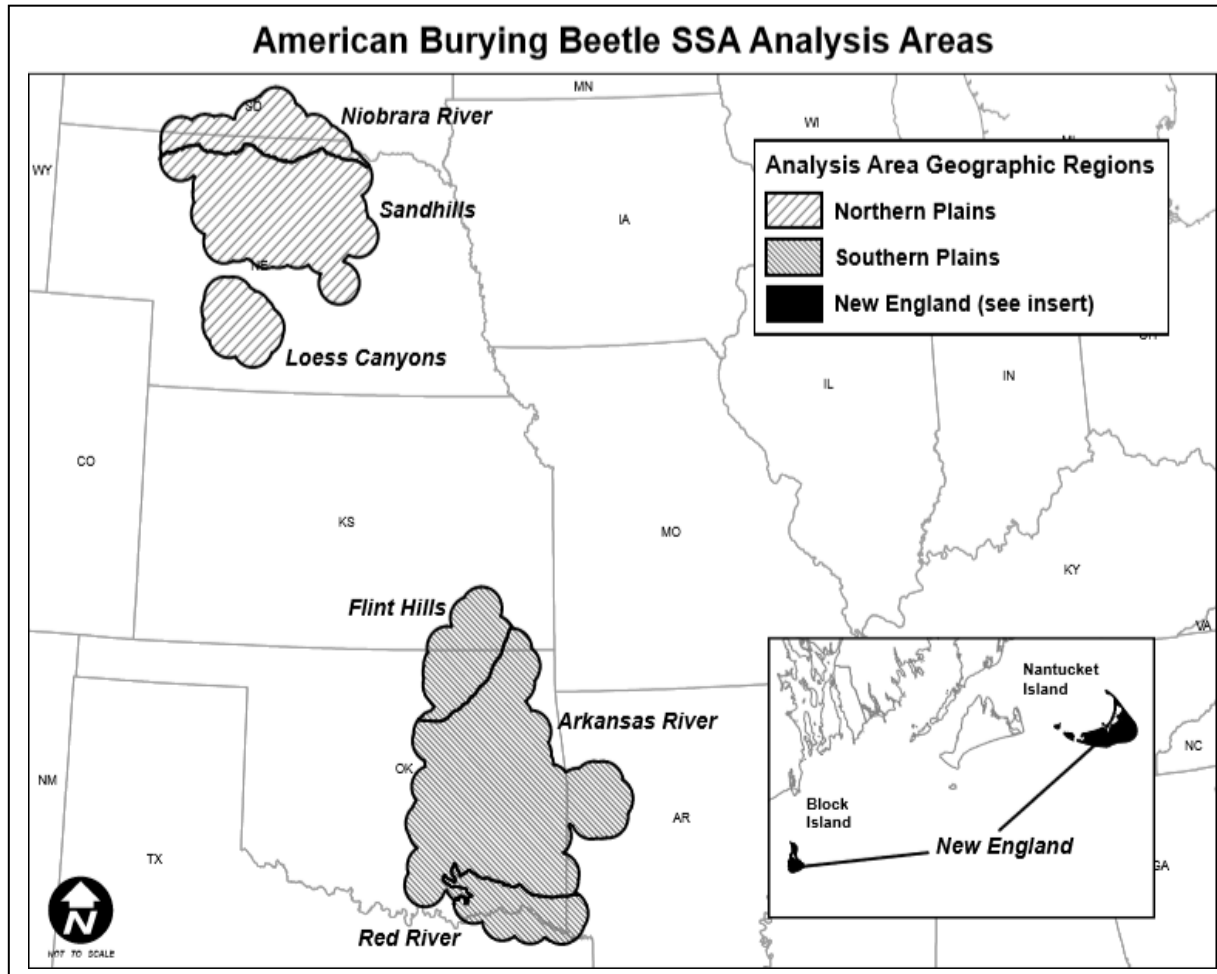


Figure 1. This figure is a map of the American burying beetle analysis areas that were evaluated in the species status assessment. The Southern Plains analysis areas include the Red River, Arkansas River, and Flint Hills analysis areas in Texas, Oklahoma, Kansas, and Arkansas. The Northern Plains analysis areas include the Loess Canyons, Sandhills, and Niobrara River analysis areas in Nebraska and South Dakota. The New England Analysis Area includes Block Island off the coast of Rhode Island, and a reintroduced population on Nantucket Island off the coast of Massachusetts.

Southern Plains

In this 4(d) rule, within the Southern Plains analysis areas, incidental take is only prohibited on certain conservation land: in Arkansas, Fort Chaffee and in Oklahoma McAlester Army Ammunition Plant and Camp Gruber/Cherokee Wildlife Management Area. However, within these conservation lands, activities conducted in compliance with Service-approved conservation plans that result in take of the species are excepted from take prohibitions. For example, on conservation lands in the Southern Plains analysis areas managed by the Department of Defense, certain activities that result in incidental take are excepted from take prohibitions if those activities are in compliance with a Service-approved integrated natural resources management plan.

New England and Northern Plains

Within the New England and Northern Plains analysis areas, the 4(d) rule only prohibits incidental take if it occurs in suitable habitat and is the result of soil disturbance, which includes converting habitat from an existing land use to a different land use. However, incidental take that is the result of normal grazing and livestock activities is excepted from take prohibitions. In addition, incidental take resulting from activities by State or Federal government agencies related to wildlife management is excepted from take prohibitions in the Northern Plains analysis areas.

Federal Actions and Consultation

Federal agency actions that involve activities related to incidental take excepted from take prohibitions under the final 4(d) rule may result in effects to the ABB if the species is exposed to action-caused stressors. Incidental take resulting from these activities may be excepted from take prohibitions; however, the final 4(d) rule does not alter the requirements for consultation under section 7 of the Act, which apply to all federal actions that may affect listed species and designated critical habitat. Section 7(a)(2) of the Act, directs federal agencies, in consultation with the Secretary, to ensure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat. Therefore, the purpose of section 7(a)(2) is broader than an evaluation of anticipated take and issuance of an Incidental Take Statement.

To address the broader purpose of 7(a)(2) for federal actions that may affect the ABB, but would not result in prohibited take under the final 4(d) rule, the Service's Headquarters Office has requested intra-agency formal consultation with the Service's Southwest Regional Office on the effects of all such federal actions. Because the Service has determined with the final 4(d) rule that regulating activities resulting in incidental take that is excepted from take prohibitions, as defined in the 4(d) rule, is not necessary or advisable for the conservation of the ABB, the Service proposes an optional framework for subsequent federal agency reliance on the findings of an intra-Service consultation that would streamline section 7(a)(2) compliance for such activities. The primary objective of the framework is to provide an efficient means for Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in this intra-Service consultation. Such verification is necessary because incidental take related to soil disturbance is prohibited in some geographic areas. We do not include specific action agencies or their specific actions in this Opinion; rather, we focus on the types of activities that may adversely affect the ABB and conduct our jeopardy analysis on these activities. Federal agencies may rely on this Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the ABB, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it

is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the ABB, but would not cause prohibited incidental take. This documentation must follow these procedures:

- a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. This determination must be updated annually for multi-year activities.
- b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
- c. For this determination, the action agency will rely on the definitions of prohibited incidental take provided in the final 4(d) rule and the activities considered in this consultation.
- d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
- e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
- f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the ABB is required; i.e., where the proposed project includes an activity that may result in incidental take not excepted from prohibitions through the 4(d) rule and thus is subject to additional consultation.
- g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the ABB fulfilled through this programmatic Opinion.

2. Reporting:

- a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
- b. The action agency must provide the results of any surveys for the ABB to the appropriate Service Field Office within their jurisdiction.
- c. Parties finding a dead, injured, or sick ABB must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures are implemented by all Federal agencies whose actions may affect the ABB:

- A. Provide habitat protection in more northern areas of the ABB range to contribute towards recovery of the species. Additional habitat protection or enhancement in or near existing populations in the Northern Great Plains or New England (see Figure 1) would help support these populations. Habitat protection and management in more northern portions of the ABB range are recommended for any project-related mitigation. Projected temperature increases may extirpate southern populations within 20-30 years and habitat protection in more northern portions of the range would provide more long-term benefits and contribute towards recovery.
- B. Support reintroduction efforts in more climate safe areas of the historical range such as the Great Lakes or New England areas.
- C. Conduct surveys for ABBs using the most recent methods recommended by the lead Service field office. Surveys will provide information on the presence and status of ABB populations over time.
- D. Conduct prescribed burns outside of the active season to minimize direct impacts to ABB.

Actions without a Federal Nexus

Actions without a federal nexus are those that are not authorized, funded, permitted, or implemented by a federal agency, or those that are not on federal lands. Incidental take from these non-federal actions may be excepted from take prohibitions under the final 4(d) rule. Although these actions do not have a federal nexus, they are covered in the Service's final 4(d) rule for the ABB and are therefore included in the evaluation of this Opinion.

As with any activity, federal or non-federal, the project proponent or federal agency should ensure that their project does not result in prohibited take. To assist with making this determination for ABB related to the 4(d) rule, the Service has developed a determination key in its Information, Planning and Consolation System (IPaC) and provided guidance on the Service's Oklahoma Ecological Services Field Office website https://www.fws.gov/southwest/es/oklahoma/ABB_Add_Info.htm.

ACTIVITIES NOT EVALUATED IN THIS BIOLOGICAL OPINION

The 4(d) rule only prohibits incidental take of the species where the Service has specifically

tailored the prohibition of incidental take in each of the three geographic areas that the American burying beetle occupies. Exceptions to take prohibitions provided under the final 4(d) rule are discussed above and are the action consider in this Opinion.

Take associated with the following general categories of activities is prohibited under the final 4(d) rule and not evaluated in the Opinion:

- a) Activities resulting in the disturbance of soils in suitable ABB habitat within the Conservation Areas in the Southern Plains analysis areas, and disturbance of soils not associated with grazing in the New England analysis area, and disturbance of soils not associated with grazing and wildlife management in the Northern Plains analysis areas. Separate project-specific section 7 consultation is required for these activities; therefore, they are not addressed further in this consultation.
- b) Direct and intentional take of ABBs. Actions such as surveys for ABBs that involve intentional take require a section 10 recovery permit and/or separate project-specific section 7 consultation for these activities.

In addition to intentional take and some forms of incidental take, the 4(d) rule also prohibits incidental take associated with activities related to possession and other acts with unlawfully taken ABBs, import and export of the species, activities related to shipping or delivering the species in interstate or foreign commerce, and the sale or offering to sell of the species. These activities are generally prohibited for endangered wildlife. We have determined that it is appropriate to extend the Act's protections to these activities as well for the ABB.

STATUS OF THE SPECIES

The status of the ABB is discussed in detail in the ABB SSA Report (Service 2019). Please refer to this document for more information on the status of the species. A more detailed life history account can be found in the Service's SSA Report for the ABB (Service 2019), which is located on our website:

http://www.fws.gov/southwest/es/Oklahoma/ABB_Add_Info.htm or
<https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=I028>.

Recovery Needs

The ABB recovery plan was approved by the Service on September 27, 1991. Since the recovery plan's development, several large populations have been discovered or reestablished in the western portion of the range, and one population has been reestablished in New England (with continued active management). Additionally, recent climate change projections as analyzed in the Service's SSA Report for the ABB (Service 2019) suggests that ABB populations in the southern portions of their range could be extirpated within 20 to 30 years. Based on these new findings, *downlisting* recovery criteria as described in the 1991 recovery plan, are no longer appropriate. Overall population goals for downlisting from the recovery plan have been greatly exceeded and the known range now includes at

least five relatively large and resilient populations that justify downlisting the species to threatened, even if they are not in the same locations as described in the recovery plan. However, future climate related threats identified in the ABB SSA Report demonstrate risks of extinction within the foreseeable future and this fits the definition of threatened. Climate related threats were not known when the recovery plan was drafted and goals for restoring populations in southern latitudes no longer appear to be appropriate. Information from the SSA Report will be used to develop a new recovery plan and inform the development of recovery criteria. Although southern populations could be extirpated in the foreseeable future due to climate change, maintaining southern population strongholds (i.e., conservation areas), will serve as important source populations for future reintroductions to more climate-safe areas in the north.

Previous and Ongoing Take of ABB

Use of Impacts to Habitat as a Surrogate for Take

Predicting the number of individual ABBs that could be taken as the result of a proposed project is difficult because there is typically no density estimate of ABB within the action area, and presence/absence surveys conducted cannot be used to estimate abundance. Take, in the form of killing and/or harming, is also difficult to precisely quantify and usually cannot be measured in terms of numbers of individuals of ABBs for the following reasons: 1) the ABB has a small body size making it hard to locate, which makes encountering dead or injured individuals unlikely; 2) ABB losses may be masked by annual fluctuations in numbers and highly concentrated movements; 3) ABBs spend a substantial portion of their lifespan underground; and 4) the species is primarily active at night. These factors make it extremely difficult to detect the amount of take that will occur. Although we cannot estimate the number of individual ABBs that will be incidentally taken, the Service is providing a mechanism to quantify when take would be considered to be exceeded.

The use of habitat as a surrogate in expressing the amount or extent of anticipated incidental take is consistent with existing Service policy. As explained in the Service's May 2015 Final Rule (80 FR 26832) surrogates may be used to express the amount or extent of anticipated take, particularly where it may be impracticable to detect or monitor take of individuals. In these situations, evaluating impacts to a surrogate, such as habitat, ecological conditions or similar affected species may be the most meaningful measure of assessing take and is consistent with the language and purposes of the Act and with relevant case law. As stated in the Service's May 2015 final rule, the use of surrogates in expressing take must describe the causal link between surrogate and take to the listed species, describe why it is not practical to use individuals for the take estimate and how it would be monitored, and set a clear standard for when the amount of take would be exceeded.

The causal link between using acres of habitat as a surrogate (50 CFR 402.14(i)(1)(i)) for take of individual ABBs is the fact that ABBs spend long periods of time relatively immobile and buried a few to several inches below the soil surface during the dormant and breeding seasons and projects evaluated through biological opinions and Habitat Conservation Plans include ground disturbance. Although ABBs are habitat generalists,

they do require suitable soils and vegetation layers. Projects that result in ground-disturbance and movement of soil may injure or crush ABBs (adults, larvae, and/or eggs during the active season and adults during the inactive season) or separate adult ABBs from their larvae or eggs. Soil disturbances that expose the brood chamber or overwintering adult ABBs may also result in mortality caused by desiccation, heat stress, or predation.

Research and Recovery Permits

Currently, more than 90 entities or individuals possess valid section 10(a)(1)(A) scientific research permits under which some authorized take of ABBs may occur. Most of these permits authorize surveys, which contribute to our understanding of ABB distribution. All research conducted under these permits must further conservation efforts for the species. Loss of some individual ABBs over the short-term from research is allowed as the research, when applied to conservation efforts, should provide long-term benefits. The Service requires implementation of every available precaution to reduce and/or eliminate authorized take associated with research activities.

Habitat Conservation Plans

Section 10(a)(1)(B) of the Act allows the Service to issue an incidental take permit for “...any taking otherwise prohibited by section 9(a)(1)(B) [of the Act] if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.” If, under section 10(a)(2)(B) of the Act, the Service finds the issuance criteria are met by the applicant, including that the applicant will, “...to the maximum extent practicable, minimize and mitigate the impacts of such taking...” the Service will issue a permit.

There are currently six HCPs which permit take of the ABB within the species’ range. Three of these are larger programmatic HCPs (spanning relatively large areas and covering multiple activities), while the other three are specific to individual projects. Total take authorized under these HCPs is 39,826 acres (16,116 hectares), which is covered through the year 2059 and is approximately 0.1 percent of the species’ available habitat within its current range. Impacts of take issued for these HCPs is offset through the use of ABB conservation banks or conservation lands that will be protected, in perpetuity, for ABB conservation. Additionally, much of the take issued under these HCPs is considered temporary, where ABB habitat will be restored within five years after disturbance.

Section 7 Consultations under the Act

The Service consults on numerous proposed actions potentially impacting the ABB, mostly in the state of Oklahoma. Project types include pipelines, roads, quarries, communication towers, residential housing development, bridges, mining, petroleum exploration/extraction/production, commercial development, recreational development, transmission lines, and water and waste water treatment facilities. Impacts from these activities vary in size and duration, with projects such as quarries being hundreds of acres and having permanent impacts, to rights-of-way of a few acres with only temporary impacts.

Most of these consultations are informal and do not result in take of the ABB. Consequently, no incidental take is authorized for these actions.

Since 2010, the Service has issued 53 formal biological opinions (fifteen of which are programmatic) where incidental take of ABB is anticipated, totaling 661,735 acres (267,795 hectares) of ABB habitat, or 0.2 percent of the species' range. Included in that total is 39,826 acres (16,116 hectares) discussed in the HCP section above. Similar to HCPs, most of the take issued for these biological opinions is considered temporary, where ABB habitat is restored within five years after disturbance. Twelve of the biological opinions were for projects that resulted in beneficial effects to the species, such as National Wildlife Refuge actions and the establishment of conservation banks. Most of the remaining non-beneficial projects offset the impacts of their taking through the use of ABB conservation banks or similarly protected conservation lands, resulting in only a minor net loss of ABB habitat.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Status of the Species in the Action Area

The action area includes the current range of the ABB which is described in the SSA Report and 4(d) rule as analysis areas that follow broad geographic and ecological patterns: Northern Plains analysis areas, Southern Plains analysis areas, and the New England Analysis Area (see Figure 1). This is the scale of "populations" referred to in the analysis of risk factors potentially affecting the species (chapters 4 and 5 in the SSA Report; Service 2019).

The SSA Report (Service 2019) also evaluated the species status and habitat suitability over the current range in Chapter 4. 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; USFWS 1991, pp.14-17, 2008, pp.8-11; Creighton et al. 1993, entire; Kozol 1995, p. 8; Lomolino et al. 1995, entire; Lomolino & Creighton 1996, entire; Jurzenski 2012, pp.47-72; Willemsens 2015, pp.5-6). See Chapter 2, Section 2.4.4 for further description of the ABB's habitat, Chapter 4 for information on current habitat, and Chapter 5 for information on future habitat assessments.

Potential habitat for the ABB within the current range was evaluated by using LANDFIRE/GAP land cover map unit descriptions (Appendix A). Land cover types were mapped within the current range and reviewed for potential suitability for ABB use. Approximately 2,040 land cover types were identified within the current range and grouped by favorable, conditional, marginal, and unsuitable ABB habitat classifications, which we defined as follows:

Favorable - Land cover types with suitable soils and vegetation to support all or critical portions of the ABB life cycle. Favorable lands may range from high to low quality ABB habitat, but most of these lands should be capable of supporting ABB populations. The ABB uses a wide variety of habitats and favorable land cover types including multiple forest, savanna, shrub, and grassland/herbaceous land covers.

Conditional - Land cover types that can be favorable under some conditions and unsuitable under others. For example, most pasture land in southern plains analysis areas may be favorable habitat if grazing is light to moderate or infrequently mowed, but the same area may be unsuitable if it is heavily grazed or frequently mowed. Fields managed for hay can be unsuitable habitat when the vegetation is mowed at short heights, but can be favorable habitat between cuttings when the grass/hay is tall enough to provide suitable habitat for birds and mammals that are carrion sources for ABBs. Wetlands are another example. They may be unsuitable under flood conditions, but very important habitat during droughts, given that ABBs need moist soils.

Marginal – Land cover types that can provide limited habitat for some portions of the ABB life cycle. Examples include land covers that have poor or thin soils (such as barren lands) that make them unsuitable for reproduction, but may provide habitat for day use or help support potential carrion species to some degree.

Unsuitable – Land cover types that do not provide habitat that would be favorable for any portion of the ABB life cycle (such as open water or highly developed urban lands).

These classifications were mapped and quantified (in acres) for each analysis area in Chapter 4 of the SSA Report. Potential future changes in habitat are addressed in Chapter 5 under several scenarios. In general, land cover types were reviewed for vegetation and soils that could directly or indirectly support ABB life history needs for food, shelter and reproduction. This includes land cover types that provide at least seasonal habitat for ABBs.

Factors Affecting Species within the Action Area

Adequately evaluating the effects of project implementation on the ABB requires that the Service consider not only the impacts from the proposed project, but the context in which they will likely occur. This context includes ongoing effects to ABB from current activities as well as anticipated effects from projects likely to occur in the foreseeable future.

Primary threats to the ABB and causes of its decline, as discussed in the Status of the Species section above, may also occur within the action area. Disease/pathogens, direct habitat loss and alteration, interspecific competition, an increase in competition for prey, an increase in edge habitat, a decrease in abundance of prey, loss of genetic diversity in isolated populations, agricultural and grazing practices, and invasive species all have adverse impacts to ABB. But the prevailing theory regarding the ABBs' decline is habitat fragmentation (Service 1991) which, due to the ABBs relatively large size and specialized breeding behavior (Creighton *et al.* 2007): (1) reduces the carrion prey base of the appropriate size for ABB reproduction, and increases the vertebrate scavenger competition for this prey (Kozol 1995, Ratcliffe 1996, Amaral *et al.* 1997, Bedick *et al.* 1999). Climate change, as discussed in the SSA Report is expected to have significant effects to the species within the action area, resulting in potential future extirpations.

In determining potential future viability, we should also consider the potential unknown or uncertain factors that led to the ABBs decline and probable extirpation of most of the eastern portion of the ABB's historical range. The potential risks that lead to the species significant geographic decline are discussed in Chapter 3 and are more thoroughly discussed in Sikes and Raithel (2002, entire). Current risks are summarized in Chapter 4 and future risks are discussed in Chapter 5 of the SSA Report. We agree with conclusions of Sikes and Raithel (2002, p.111) regarding what factors may have led to the species' decline, but uncertainty remains as to the exact causes and if those causes may be affecting current populations. Most of the eastern ABB populations were extirpated in about a 50 year period (1920-1970, although the decline likely started before then). We have not documented wide ranging declines in the ABB's existing range in the last 50 years and our known range has expanded, although this is probably due to increased survey effort. The reasons for why the decline would stop or slow are unknown; however, we have observed some declines in the Red River Analysis Area since 2005. As discussed in the SSA Report, evidence suggests that these recent observed declines are related to changing climate conditions in the southern extent of the occupied range, but we cannot rule out other contributing causes.

EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of all other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR §402.17).

Analysis for Effects of the Action

The ABB is likely to be affected by many activities with incidental take that is excepted from incidental take prohibitions in the final 4(d) rule. Instead of describing all of the activities, we address the effects of different activities, which we categorized into general groups:

1. Soil disturbance related to urban expansion or construction of structures
2. Soil disturbance related to agricultural conversion of ABB habitat to cropland
3. Soil disturbance related to grazing and ranching practices
4. Soil disturbance related to prescribed fire
5. Soil disturbance related to forestry practices
6. Wind Industry development and turbine operation
7. Soil disturbance related to oil and gas development
8. Soil disturbance related to road construction and maintenance
9. Soil disturbance related to transmission line construction and maintenance
10. Soil disturbance related to water line infrastructure construction and maintenance
11. Soil disturbance related to communication infrastructure construction and maintenance
12. Soil disturbance related to wildlife management.
13. Other activities with soil disturbance

For each of the categories of activities described above, we reviewed the best available science and commercial information to assess the effects on ABBs at the programmatic level for both individuals and populations. Some effects are evaluated for 30 years because climate-related impacts are projected to extirpate the ABBs in the Southern Plains within 30 years. Most effects are evaluated in the SSA Report through 2099, but the foreseeable future for the final rule is through 2069 and some information is only available or projected for about 50 years. Most of the information provided for soil disturbance activities is based on the Oklahoma portion of the Southern Plains analysis areas because very few projects in Arkansas or Kansas portions have positive ABB surveys and include incidental take. For example, most ABB surveys in Arkansas (outside of Fort Chaffee) are negative and relatively few projects require an incidental take permit.

1. Soil disturbance related to urban expansion or related construction of structures

Incidental take resulting from this activity is excepted from take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). The impacts of urban expansion are evaluated in the SSA Report for all analysis areas and projections are quantified through 2099. Land use changes will not occur equally across the analysis areas and potential changes are applied according to the best available information and/or according to past or current trends. Rates of predicted urban growth over 50 years are highly variable within the large analysis areas and range from 0-5% in most areas and up to 20-60 percent in a few large urban areas. The 10% (scenario 1) and 20% (scenario 2) net increases (relative to existing conditions) in urban areas were evaluated in the SSA Report and intended to be estimates for potential expansion out to 2099. Some urban areas, such as near Tulsa, Oklahoma, are predicted to expand 20-60% (Nowak and Walton 2005, p. 384) and could impact existing ABB habitat, but most urban growth in the analysis areas is predicted to be far less and there are only a few large metropolitan areas in the analysis areas. Most of the Southern Plains analysis areas are rural with only small urban areas. Some areas are predicted to lose population and are less likely to expand. Population changes do not always represent the area's urban expansion, but can be used to estimate potential future urban growth. Areas with no or low population increases are not expected to have much habitat

loss due to urban growth. There are 25 counties in Oklahoma forecasted to experience population decline by 2075 and many of the counties within the ABB range are predicted to have relatively low rates of increase. For example, the Hughes County population is expected to decline and Coal County's population is expected to increase by about 5% by 2075 (Oklahoma Department of Commerce 2012, page 4, 42,76).

Assuming a 20% increase in urban land type (relative to current urban land type), the Southern Plains area would have up to 203,669 acres of incidental take through urban expansion through 2099. This loss of habitat would be equivalent to about 1% of the existing 19,995,088 acres of suitable habitat for the Southern Plains analysis areas. Our assumptions for land use changes were made to be within a potentially plausible range, but even if those percentages were increased, and the permanent loss was doubled, the losses would only amount to about 2% of the suitable habitat. If we limit the timeframe to 30 years, the loss of habitat would be projected to be about 76,376 acres with the 20% expansion scenario and would impact about .4% of the suitable habitat. Even if future urban expansion is doubled, this is less than 1% of the suitable habitat.

Some of these urban expansion actions are associated with HCPs and section 7 consultations but many are not and that is partially due the fact that a higher percentage of ABB surveys near urban areas are negative. However, a portion of the road construction projects covered by programmatic formal consultation with the Federal Highway Administration and the Bureau of Indian Affairs are in or near urban areas. A programmatic section 7 consultation with the Cherokee Nation includes incidental take for many projects that are near small urban areas: Roads – 381 acres, Waterline and sanitation -125 acres, Houses – 1200 acres, Community facilities – 50 acres, Utility line relocation – 120 acres, Other miscellaneous projects – 400 acres with a total of 2,276 acres over ten years.

2. Soil disturbance related to agricultural conversion of ABB habitat to cropland

Incidental take resulting from this activity is excepted from take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Cropland is a dominant land cover in some areas with appropriate soils and is a common land cover in large river floodplains, but potential for large scale increases in cropland is limited in most of the southern analysis areas due to a predominance of soils and slopes that do not favor intensive row crop agriculture. Most of the Southern Plains analysis areas are in some form of agricultural use, but relative to the Northern Plains, a lower percentage is cropland and a larger percentage of land uses are related to forestry, pasture or hay. Therefore, we assume this pattern will continue and used a relatively low (2%) net increase in cropland for our status quo current rate scenario and a 5% net increase for our accelerated scenario, out to the year 2099. Higher crop prices could trigger some conversion of pasture or hayfields to cropland, but cropland has declined or had only minor increases in recent years and is a relatively small percentage of southern analysis areas (see section 4.2 of the SSA Report for descriptions of land covers in analysis areas). Land use changes are variable over time and can fluctuate due to market and economy conditions. The rates used for this scenario are based on current and previous rates of change. Long-term agricultural changes such as conversion of suitable habitat (usually pasture or hay production) to tilled cropland (5% net

increase) are expected to impact up to 42,624 acres under this scenario by 2099. This loss of habitat would be less than 1% of the existing 19,995,088 acres of suitable habitat for the Southern Plains analysis areas. If we limit the timeframe to 30 years to cover the potential presence of ABBs (extirpation projected within 30 years), the loss of habitat in the Southern Plains would be projected to be about 15,984 acres with the 5% expansion scenario and would impact about .08% of the suitable habitat.

3. Soil Disturbance related to Grazing

Incidental take resulting from grazing and ranching activity is excepted from incidental take prohibitions throughout the ABB's current range (Northern Plains, New England, and Southern Plains analysis areas (not including four Conservation Areas in the South)). Large areas of the current range are managed for livestock ranching and grazing activities. Because incidental take stemming from normal livestock ranching and grazing activities is not expected to have an appreciable negative impact on the species, and retaining land uses associated with ranching or grazing (rather than converting the land to row crops) provides potential habitat for the species, we are proposing to allow any incidental take associated with ranching and grazing. Ranching and grazing means activities involved in grazing livestock (e.g., cattle, bison, horse, sheep, goats or other grazing animals) such as: gathering of livestock; construction and maintenance of fences associated with livestock grazing; installation and maintenance of corrals, loading chutes, and other livestock working facilities; development and maintenance of livestock watering facilities; placement of supplements such as salt blocks for grazing livestock; and, when associated with livestock grazing, the control of noxious weeds, haying, mowing, and prescribed burning. Ranching and grazing does not include any form of tillage, conversion of grassland to cropland, or management of cropland.

The SSA Report evaluated potential ABB habitat in all analysis areas and lands with grazing are considered conditional habitat or habitat that can be favorable under some conditions and unfavorable under others (see definitions in the Status of the Species in the Action Area section). The SSA Report estimates about 9,146,297 acres of conditional habitat in the Southern Plains analysis areas, 11,071,249 acres of conditional habitat in the Northern Plains analysis areas, and 9,459 acres in New England analysis areas. Most of these lands are used for hay or grazing. A minor percentage of lands used for grazing are impacted by soil disturbance for operational and maintenance activities related to livestock grazing. We estimate less than 10 percent of grazing lands have any significant soil disturbance on an annual basis and the 4(d) rule excepts this potential incidental take. Most of these disturbances are temporary but 10 percent of the conditional habitat is 914,630 acres in the Southern Plains, 1,107,125 acres in the Northern Plains, 946 acres in New England analysis areas.

Relatively few grazing actions are currently requesting consultation or permits for incidental take of ABBs. Some consultations with the Bureau of Land Management, Bureau of Indian Affairs, U.S. Army Corps of Engineers, U.S. Forest Service, and Natural Resource Conservation Service have included grazing actions, but the grazing is moderated or conditioned to avoid most incidental take.

Grazing and haying can impact ABB habitat but the effects are temporary and related to the effects of vegetation changes on habitat for carrion species that support the ABB. The effects of grazing are described in the SSA Report and estimates of habitat impacts related to haying and grazing are estimate under scenarios for normal and draught conditions. Intensive grazing or mowing that maintains relatively short vegetation (less than 8 inches in height) appears to adversely affect ABB presence more in the Southern Plains analysis areas (relative to all other analysis areas) and this condition could increase in future years due to changes in climate and livestock markets. The shorter vegetation is not likely to directly affect ABBs, but is less favorable habitat for potential carrion in the southern analysis areas that would be in a preferred size range for ABB reproduction. We evaluated the potential effects of grazing and related agricultural use in the Northern Plains analysis areas. However, ABB survey results suggest that ABB presence within the Northern Plains and New England Areas are relatively common in areas affected by grazing, at least in comparison to similar areas in the Southern Plains analysis areas. Normal grazing practices in the Northern Plains analysis areas currently support ABB habitat and populations that have some of the highest densities (based on catch per trap night data and percentages of positive to negative surveys). The Sandhills Analysis Area in Nebraska is dominated by grazing lands and is considered to have high resiliency (Service 2019). Potential carrion sources in northern analysis areas are different than in southern analysis areas and may be adapted to shorter grasslands. For example, prairie dogs and ground squirrels prefer shorter grasses and do not occur in the Southern Plains analysis areas. The effects of grazing and the differences between Northern and Southern Plains analysis areas are discussed in the SSA Report, Chapter 3, section 3.1 and Chapter 5 in several sections. Assumptions for the effects of temporary agricultural impacts like high utilization of vegetation via grazing or mowing for hay during drought conditions, are discussed for each Southern Plains Analysis Area. For these temporary effects we assumed a potential 30% reduction in conditional habitat for a low rate and a 60% reduction in conditional habitat as a high rate. Even at the higher rate (60%), the grazing and haying effects on habitat did not reduce the resiliency of populations in the Southern Plains. These were considered temporary effects because habitat would recover when drought conditions ended or if grazing or haying were reduced.

As an example for the Southern Plains, Arkansas River Analysis Area, assuming up to 60% of the conditional lands could be affected by high grazing pressure and hay production during droughts, 3,552,553 acres of conditional lands would be at least temporarily changed to unfavorable lands. However, the resiliency for this analysis area is not as sensitive to conversions from conditional to unfavorable lands because it is large and has 8,134,009 acres of favorable habitat. This would not change the resiliency condition of good for available habitat in this analysis area, because the combined losses of urban expansion, long-term agricultural changes, and conditional habitat impacted during droughts (3,730,632 acres or about 26% of the suitable habitat) still leaves about 10,739,971 acres of suitable habitat. Not all of the land use changes are likely to occur in suitable habitat so the actual impacts are likely to be less than the percentages described above.

Other agricultural impacts to habitat include construction of buildings to house or shelter livestock and confined feeding operations for livestock usually include buildings and waste

lagoons. However, confined feeding operations are not considered ranching or grazing and incidental take resulting from these activities is not excepted from incidental take prohibitions in the 4(d) rule for the Northern Plains and New England analysis areas. Poultry and swine confinement operations are relatively limited in most of the ABB range and 4(d) exceptions to incidental take prohibitions for these operations only apply in the Southern Plains. Only limited areas of the Southern Plains analysis areas have many confined feeding operations and most of those are in portions of eastern Oklahoma and western Arkansas that appear to support low density ABB populations. Take resulting from grazing and ranching activities is excepted from take prohibitions in the Northern Plains and New England analysis areas, but only small portions of grazing operations include buildings for storage of equipment, hay, or shelter for livestock.

4. Soil disturbance related to prescribed fire

Incidental take resulting from this activity is excepted from take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas) and potentially in the Northern Plains analysis areas if associated with state or federal agency wildlife management actions. Soil disturbance related to prescribed fire is assumed to be relatively low in the Southern Plains analysis areas because only a low percentage of the analysis areas burn each year and only a low percentage of those burned areas have any soil disturbance. Prescribed fire is used to manage rangeland and some forest lands within the Southern Plains analysis area. Most prescribed fire is conducted during the winter months when ABBs are underground and dormant and this reduces the potential for incidental take. The Service has authorized or excepted incidental take for soil disturbance related to creating or maintaining fire breaks for several federal agencies and the ABB conservation banks in the Southern Plains. Some firebreaks are only temporary impacts and others are more permanently maintained. However, periodic prescribed fire enhances ABB habitat and the overall effects are beneficial. Most private prescribed fire has not coordinated with the Service and therefore, we do not have accurate assessments of the total area of soil disturbance related to prescribed fire. The total incidental take related to prescribed fire is included in our jeopardy analysis but typically prescribed fire has only minor temporary adverse effects that are not cumulative, and the benefits to ABB habitat outweigh any negative impacts.

5. Soil disturbance related to forestry practices

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Commercial or frequent forestry related soil disturbance is limited within the ABB range in the Southern Plains. Some portions of the range in western Arkansas and southeastern Oklahoma have commercial forestry operations and the U.S. Forest Service manages portions of the range in those same areas. These areas of the Southern Plains analysis areas have had very limited numbers of positive ABB surveys in the last 15 years. U.S. Forest Service actions in Oklahoma and Arkansas are currently covered by a programmatic biological opinion and monitoring efforts indicate very low ABB abundance on their lands. Commercial forestry does affect thousands of acres in southeastern Oklahoma. Weyerhaeuser Company forestry

actions in Arkansas and Oklahoma were addressed in an approved HCP, but no positive ABB surveys have occurred within the HCP action area or surrounding portions of the range since 2005. Most of the commercial forestry activity is within the Red River analysis area and hardwood forests, mixed hardwood and evergreen forest and commercial timber (mostly pine plantations) operations dominate large areas (1,109,107 acres or 34%) of the analysis area. No positive surveys within this analysis area have been documented in Arkansas or Texas and only 8 positive surveys are known in Oklahoma since 2008. The Arkansas River analysis area has over 7,000,000 acres of forested habitat (about 40% of the analysis area), but less than 2,000,000 acres are likely to have significant commercial timber operations and very few of these forestry actions are seeking incidental take permits. The Flint Hills analysis area has some forested areas, but no commercial forestry. The 4(d) rule exceptions for soil disturbance related to forestry activities in the Southern Plains analysis areas have little potential to affect ABB populations because the areas with this land use are a small percentage of the suitable habitat and most of these activities are in areas with very limited ratios of positive surveys.

For example, the Ouachita National Forest - Oklahoma Ranger District has been conducting surveys at 22 sites each year and have only captured 5 ABBs since 1995. The limited number of positive ABB surveys in the entire Red River Analysis Area makes it unlikely any forestry actions there would affect ABBs. We estimate that less 10 percent of forestry actions in the remainder of the Southern Plains analysis areas would have potential for incidental take of ABBs. Of the approximately 2,000,000 acres of potential timber operations in the Arkansas River Analysis Area, 10 percent would be 200,000 acres. Forestry practices in the Southern Plains analysis areas have little potential to affect ABB populations because the areas with this land use are a small percentage of the suitable habitat (about 10 percent of the 19,995,088 acres of suitable habitat for the Southern Plains analysis areas) and most of these activities are in the southeastern portion of the Southern Plains analysis areas with very limited ratios of positive surveys. The ABB populations in the southeastern portion (mostly Red River Analysis Area) have declined since the early 2000s and information in the SSA Report indicates that climate changes may be responsible. Areas of dense forest and high canopy cover tend to have very low ratios of positive surveys for ABBs. This is true for most forested areas, not just areas with commercial forestry operations, and thinning or harvesting timber periodically enhances ABB habitat in most cases. Large areas of national forest with only limited harvest have had very low ratios of positive surveys. Forested areas may not support enough appropriate sized carrion to maintain high numbers of ABBs and species like cotton rats are less abundant in forested areas. Most proposed forestry actions in the Southern Plains analysis areas could proceed without an incidental take permit because they likely would have negative surveys for ABBs. Additionally, incidental take related to soil disturbance with forestry activities is periodic, but generally temporary.

6. Wind Industry Development and Turbine Operation

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). The 4(d) rule does not except incidental take prohibitions to wind development actions in the Northern

Plains or New England analysis areas. Commercial wind industry related soil disturbance is very limited within the ABB range in the Southern Plains (see Figure 2 and Table 1). The Federal Aviation Administration (FAA) requires lighting for wind turbine towers and maintains a database of wind turbine towers (see Figure 2 and Table 1). The FAA database indicates an increase in wind turbines since 2010 and Figure 2 provides general locations or concentrations for these wind turbines. There are only 5 existing wind energy developments within the Southern Plains analysis areas and most of these are near the western edge of the ABB range (see Figure 2). There are 6 additional proposed projects and most of these are near the northwestern edge of the Southern Plains ABB range. A large percentage of the ABB surveys on the western edge are negative for ABBs and most developments would only have a small percentage of positive surveys within each development, but at least one proposed project had about 60 percent positive surveys. That proposed project has submitted an HCP and would have about 930 acres of total soil disturbance and 60-80 percent of that disturbance could occur in areas with positive surveys. All other existing wind projects in Oklahoma have had negative ABB surveys. Within the Southern Plains analysis areas, the current area of wind projects is relatively small, and there is limited potential for expansion. Less than 10 percent of the Southern Plains analysis areas have annual average wind speeds of 6 meters/second (m/s) or greater at 30 meters height that are recommended for wind development.

If we assume up to 15 additional wind power projects with 100 turbines each are proposed within the ABB range in the Southern Plains and each of these has 50 percent positive ABB surveys, we would expect potential incidental take for up to 750 turbines and associated soil disturbance over a 30 year period. Current projects have about 9 acres of soil disturbance per turbine with the combined effects of pads, roads, and transmission lines. The total incidental take would be 6,750 acres of ABB habitat that would be excepted from take prohibitions by the 4(d) rule. This loss of habitat would be less than 1% of the existing 19,995,088 acres of suitable habitat for the Southern Plains analysis areas.

Table 1. Wind Turbines per Analysis Area for 2010-2019 (FAA Data). This table provides the number of known wind turbines in the Arkansas River (row 2), Flint Hills (row 3), Red River (row 4), Niobrara River (row 5), Loess Canyons (row 6), and Sand Hills (row 7) analysis areas for years 2010 (column 2), 2013 (column 3), 2017 (column 4), 2018 (column 5), and 2019 (column 6). Total numbers of wind turbines for each year are provided in row 8,

Analysis Area	2010	2013	2017	2018	2019	
Arkansas River	265	354	947	1252	1431	Southern Plains
Flint Hills	201	610	1211	1278	1278	Southern Plains
Red River	1	6	6	6	6	Southern Plains
Niobrara River	22	1243	2574	2576	2576	Northern Plains
Loess Canyons		2	2	2	2	Northern Plains
Sand Hills	295	1003	1808	1813	2059	Northern Plains
Grand Total	784	3218	6548	6927	7352	

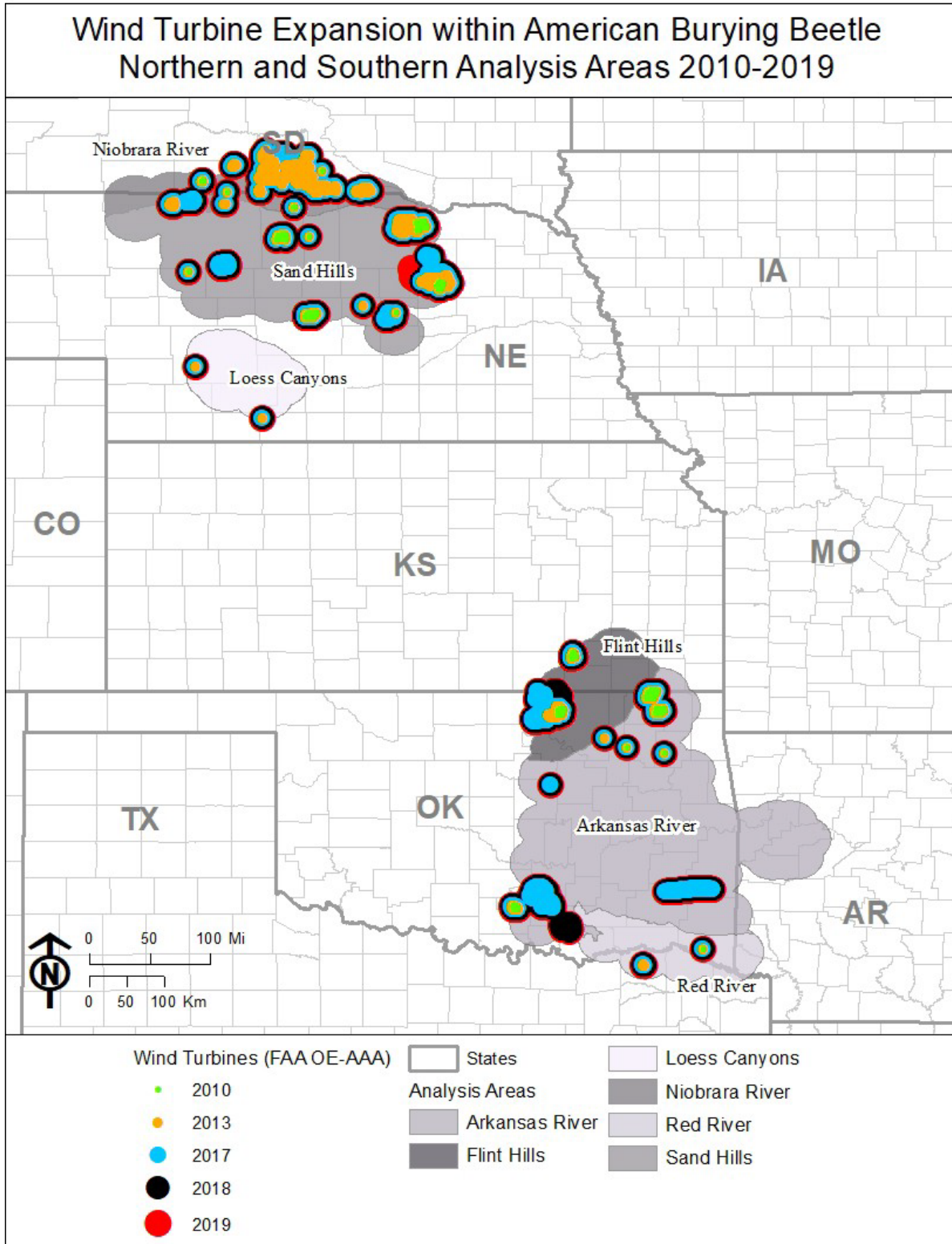


Figure 2. Map of Wind Turbine locations in ABB Northern and Southern Plains Analysis Areas 2010-2019

7. Soil disturbance related to oil and gas development

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Oil and gas development can be significant in some areas, but the total impact is minor compared to agriculture or urban expansion in the entire Southern Plains analysis areas. In Oklahoma, an Industry Conservation Plan (ICP) was developed to streamline ESA compliance for the oil and gas Industry. Approximately 32,000 acres of oil and gas related soil disturbance were estimated to occur (between 2014-2016, within the potential ABB range in Oklahoma), but the actual rate has been much less and about 67 percent of the soil disturbance currently addressed through the ICP is considered temporary. The ICP covers most of the combined Red River, Arkansas River, and Flint Hills analysis areas. To date (about 6 years), about 5,362.25 acres of disturbance has been reported and about 85 percent of this is temporary impacts related to pipelines. Approximately 5,558 acres of habitat have been protected through mitigation and additional mitigation areas are proposed. Some percentage of oil and gas related soil disturbance is not being reported through the ICP, but projects with negative surveys are not required to get an incidental take permit and some percentage of the ICP reported take is associated with projects that assumed presence and did not conduct surveys. At this rate, approximately 27,000 acres would be impacted with about 4,000 acres of permanent impacts over a 30 year period. However, oil and gas activity has been relatively low during recent years and may not represent future conditions. If we assume 60,000 acres of habitat impacts and 9,000 acres of permanent loss over a 30 year period (about 2 times the recent rate), the impacts are less than 1% of the 19,995,088 acres of suitable habitat for the Southern Plains analysis areas.

8. Soil disturbance related to transmission line construction and maintenance

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Soil disturbance related to projects like powerlines, water and sewage pipelines and road construction/maintenance have potential for incidental take. Utility projects frequently use road right-of-ways for portions or all of project. The Service has addressed incidental take for road projects through programmatic formal consultation with the Federal Highway Administration and the Bureau of Indian Affairs. Several HCPs have been completed for transmission line and pipeline projects. Based on the last 5 years of data from the programmatic formal consultation with the Federal Highway Administration, approximately 150-200 acres of incidental take are authorized each year for transportation projects and about 50 percent of these acres are permanent habitat losses. Mitigation through habitat protection at conservation banks has been implemented for these transportation projects and some tribes have created their own mitigation areas. Using these estimates we would assume up to 6,000 acres of incidental take related to transportation projects over a 30 year period.

Incidental take for transmission lines has been less than 200 acres per year and most of this is permitted through HCPs and section 7 consultations. Up to 6,394 acres of incidental take are authorized under a programmatic HCP for transmission lines over a 30 year period in the

Southern Plains analysis areas. Mitigation through habitat protection at conservation banks has been implemented for these transmission projects. Most of the soil disturbance related to transmission lines are temporary impacts.

9. Soil disturbance related to road construction and maintenance

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Soil disturbance related to projects like powerlines, water and sewage pipelines and road construction/maintenance have potential for incidental take. The Service has addressed incidental take for road projects through programmatic formal consultation with the Federal Highway Administration. Based on the last 5 years of data from the programmatic formal consultation with the Federal Highway Administration, approximately 150-200 acres of incidental take are authorized each year for transportation projects and about 50 percent of these acres are permanent habitat losses. Mitigation through habitat protection at conservation banks has been implemented for these transportation projects. Using these estimates we would assume up to 6,000 acres of incidental take related to transportation projects over a 30 year period.

10. Soil disturbance related to water infrastructure construction and maintenance

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Waterlines and treatment facilities can have local impacts, but construction and maintenance activities can be very inconsistent. We currently have 1,045 acres of potential soil disturbance proposed permitted over the last 5 years due to water infrastructure projects in the Oklahoma portion of the Southern Plains analysis area. Most soil disturbance related to pipelines are temporary impacts and most of the disturbed areas are restored to suitable habitat within a few years. Some water storage, treatment facilities, access roads, and pump stations related to the water pipelines are permanent impacts. If similar levels of projects occur in the future, we would expect approximately 6,270 acres of soil disturbance related to water infrastructure in the next 30 years in the Southern Plains analysis areas.

11. Soil disturbance related to communication infrastructure construction and maintenance

Incidental take resulting from this activity is excepted from incidental take prohibitions only in the Southern Plains analysis areas (not including four Conservation Areas). Projects related to communications such as cell towers, broadband, cable installation and possibly other options can have soil disturbance and have permanent and temporary effects on habitat. Some of this would be accounted for in urban expansion but many of these projects are in rural areas.

In projecting the estimated number of telecommunications facilities to be constructed, the Federal Communication Commission's (FCC) assumed that numbers of telecommunications facilities in the ABB's range grew at the same rate as the national average. Using the Cellular Telecommunications Industry Association's (CTIA) annualized wireless industry

survey results the FCC calculated the average national growth rate for construction of facilities from 2012 to 2018 at 3.1 percent and to account for spikes during technology changes, an estimated 4.1 percent average growth rate from 2015 to 2018 (CTIA 2018). Based on these sources, the FCC estimated that there are currently 1,537 telecommunication facilities in the ABB range in Oklahoma. Applying the 3.1 percent and 4.1 percent increases in growth rates to the estimated 1,537 existing telecommunications facilities results in an estimated 51-68 new facilities built in ABB range each year between 2020 and 2024, with a total of 255-340 new facilities. With an abundance of caution and for the purposes of including ample opportunity for use of the programmatic by proponents, the FCC bases subsequent calculations on the high end of the estimate, 340 new telecommunications facilities between 2020 and 2024 in the ABB's current range in Oklahoma and we estimate approximately 400 new facilities in the entire Southern Plains analysis area. If we extrapolate these estimates to 30 years, up to 2,400 new facilities could be constructed in the Southern Plains analysis areas. Not all of these would be constructed in suitable habitat or have positive ABB surveys.

The footprint of telecommunications facilities varies significantly by location and specific project need. However, based on average project footprints of telecommunications facilities the FCC estimates that each telecommunications facility project will result in 2.72 acres of ground disturbance, including approximately 0.65 acres for access roads/utility rights of way, 0.63 acres for the tower pad and associated staging areas, and 1.44 acres for construction and maintenance of tower guy wires. If we assume up to 50 percent of the estimated 2,400 new telecommunications facilities would involve incidental take of ABBs, the 1,200 facilities would result in about 3,264 acres of soil disturbance over 30 years.

12. Soil disturbance related to Wildlife Management

Incidental take resulting from wildlife management conducted by state and federal agencies is excepted from take prohibitions within the Southern and Northern Plains analysis areas. Actions such as controlling invasive Eastern red cedar and prescribed fire are habitat management practices that benefit ABBs and other wildlife. The soil disturbance related to wildlife management activities is expected to be relatively small, usually temporary and largely beneficial. Minor impacts related to actions like firebreaks and thinning of trees are temporary and necessary to achieve the beneficial effects on ABB habitat and carrion sources. Many actions on the Conservation Lands in the Southern Plains would be considered wildlife management and any take related to these actions would be excepted if they were in compliance with a Service approved management plan. All effects are assumed to be beneficial.

Total soil disturbance activities that may affect incidental take of the ABB

The total incidental take resulting from soil disturbance that would potentially be excepted from take prohibitions in the Southern Plains analysis areas through the 4(d) rule would be about 1,289,398 acres over a 30 year period (Table 2). This is an estimated combined total of urban expansion (76,376 acres), conversion to cropland (15,984 acres), forestry practices (200,000 acres), wind energy (6,750 acres), oil and gas development (60,000 acres), roads

(6,000 acres), transmission lines (6,394 acres), water infrastructure (6,270 acres), communications infrastructure (3,264 acres) and grazing/ranching (914,630 acres). Some of these actions are mostly temporary impacts (transmission lines and pipelines) and others (urban expansion, conversion to cropland, and roads) are mostly permanent. The 4(d) rule exceptions from incidental take prohibitions for incidental take resulting from soil disturbance related to forestry activities, transmission lines, pipelines and grazing/ranching are largely temporary soil disturbances and account for about 1,121,738 acres (or 87%) of the 1,295,668 total acre soil disturbance estimate. The total potential soil disturbance that may result in incidental take over all analysis areas is 2,403,739 acres and most of this disturbance is temporary.

Distribution: Exceptions under the 4(d) rule apply to all portions of the range but are limited to grazing and wildlife management actions in the Northern Plains and New England analysis areas. The exceptions are more extensive in the Southern Plains. The three Southern Plains analysis areas are adjacent and combined they include about 60 percent of the current range of the ABB. The three areas combined are approximately 24,712,233 acres in size. The ABB is 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.

Consequences of the Proposed Action

Northern Plains and New England Analysis Areas

Incidental take exceptions for incidental take resulting from grazing in the New England and Northern Plains analysis areas would streamline compliance for these actions and are not likely to change ABB habitat or populations, but may support and encourage land use actions that maintain ABB habitat. Some limited incidental take related to grazing may occur (see a more complete discussion in The Effects of the Action section above), but most of the best habitat and highest percentages of positive ABB surveys, such as the Sandhills of Nebraska, are in areas where grazing is the predominant land use. A relatively large area will be affected (approximately 1,107,125 acres) but nearly all of this area is already being grazed by livestock.

Incidental take exceptions for incidental take resulting from wildlife management activities by federal and state agencies in the Northern Plains analysis areas is likely to have a beneficial effect on ABB habitat and populations. The 4(d) rule exceptions would streamline and encourage wildlife management actions in the Northern Plains analysis areas. A more complete discussion is provided in The Effects of the Action section above.

Table 2. Summary of Potential Habitat Impacts (next 30 years) In the Southern Plains (column 3), Northern Plains (column 4) and New England (column 5) Portions of the ABB Range Related to 4(d) Rule Exceptions. This includes potential acres of soil disturbance due to urban expansion (row 1), agricultural conversion to cropland (row 2), grazing and ranching (row 3), prescribed fire (row 4), forestry practices (row 5), wind energy development (row 6), oil and gas development (row 7), transmission lines (row 8), road construction (row 9), water infrastructure (row 10), communications infrastructure (row 11), and wildlife management (row 12).

Activity - Soil disturbance related to....	Habitat Impact Type	Potential Acres of Impact (next 30 years)		
		Southern Plains	Northern Plains	New England
1 - Urban Expansion or related construction	Mostly Permanent	76,376	.	.
2 - Agricultural conversion of ABB habitat to cropland	Mostly Permanent	15,984	.	.
3 - Grazing and Ranching	Mostly Temporary	914,630	1,107,125	946
4 - Prescribed fire	Overall Beneficial	Overall Beneficial	Overall Beneficial(Wildlife Management related)	.
5 - Forestry practices	Temporary & Permanent	200,000	.	.
6 - Wind energy development	Mostly Permanent	6,750	.	.
7 - Oil and gas development	Mostly Temporary	60,000	.	.
8 - Transmission lines and maintenance	Temporary & Permanent	6,394	.	.
9 - Road construction and maintenance	Temporary & Permanent	6,000	.	.
10 - Water infrastructure	Mostly Temporary	6,270	.	.
11 - Communications infrastructure	Mostly Permanent	3,264	.	.
12 - Wildlife Management	Overall Beneficial	Overall Beneficial	Overall Beneficial	
	TOTAL	1,295,668	1,107,125	946

Southern Plains Analysis Areas

Individual ABBs and local impacts to habitat as a result of activities with incidental take

related to 4(d) rule exceptions are expected in the Southern Plains analysis areas, but combined impacts are expected to affect less than 7% of the 19,995,088 acres of suitable habitat. There are some urban areas in the Southern Plains analysis area, but they are not near areas of ABB concentrations or the concentrations near urban areas are on protected lands that would not be affected by urban expansion. Some land uses such as oil and gas development can have local impacts, but individually most of these land uses are expected to affect less than 1% of the suitable habitat in southern analysis areas as a whole. Most of these analysis areas are rural and any changes in rural land uses are expected to have a relatively minor effect on ABB populations. The large areas of known and potential habitat in the Southern Plains tend to buffer the effects of most land use changes such as urban and cropland expansion when these changes affect such a low percentage of the suitable habitat. There is a potential exception of about 1,295,668 combined acres of incidental take in the Southern Plains analysis areas related to soil disturbance over a 30 year period associated with the downlisting and 4(d) rule. We used a 30 year period because climate projections indicate likely extirpation of ABBs within the Southern Plains analysis areas within that timeframe. Most of that incidental take is related to actions with temporary impacts and less than 20% of the potential 1,295,668 acres of take is likely to be related to actions that have permanent impacts to ABB habitat.

The proposed actions, when considered individually or combined, would not jeopardize the species or any populations. All federal actions will continue to go through section 7 consultation for projects that may affect the ABB. This programmatic Opinion will streamline that process, and federal agencies will still minimize adverse effects through consultation.

Summary of Effects to the Species

The Service defines “to jeopardize the continued existence of a listed species” as 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 the species. Incidental take excepted from take prohibitions through the 4(d) rule would not result in jeopardy to the ABB or affect the resiliency of any populations. Individual ABBs and local impacts to habitat are expected in the Southern Plains analysis areas, but these impacts are expected to affect less than 7% of the suitable habitat and have no effect on the resiliency of populations. Excepting incidental take resulting from grazing or wildlife management from take prohibitions in the New England and Northern Plains analysis areas would streamline compliance for these actions and are not likely to change ABB habitat or populations, but may support and encourage land use actions that maintain ABB habitat.

Effects on Recovery

There are no changes anticipated in resiliency or recovery of existing populations due to the exceptions from take prohibitions identified in the 4(d) rule. Exceptions from take prohibitions in the Southern Plains analysis areas are expected to affect less than 7% of the suitable habitat and have no effect on the resiliency of populations. Three large

conservation areas in the Southern Plains retain current protections to help provide continued monitoring and sources of ABBs for reintroduction/relocation efforts. Risks for the Southern Plains populations are primarily related to future increases in temperature and other climate changes (as described in chapter 5 of the ABB SSA Report). Recovery options for these populations will include reintroductions/relocations to more climate safe areas. Exceptions from take prohibitions for grazing and wildlife management in the New England and Northern Plains analysis areas would support and encourage land use actions that maintain ABB habitat. Exceptions for incidental take in the historical, but extirpated, portions of the range may encourage reintroduction efforts that would contribute to recovery of the species. Incidental take in areas with reintroductions would be excepted from take prohibitions and streamline the process because most reintroductions involve designation of experimental populations to address the public's concerns in the affected areas.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion (50 CFR 402.02). 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 Act.

Historically and to a lesser extent currently, land conversion to agriculture, intensive domestic livestock grazing, logging, fire suppression, wind energy development, and urban development are common causes of habitat quality reductions, loss, and fragmentation within the current range of the ABB. Relatively few of these land use actions would have any federal nexus. Two scenarios in the SSA Report (Service 2019) explore potential future land use changes to help characterize the likely potential for impacts to suitable habitat for the ABB. Land use changes were evaluated separately for each analysis area because they are a risk factor for current conditions. The projected combined permanent loss of suitable habitat from all sources for the Southern Plains analysis areas is 1.2% or 246,293 acres from the existing 19,995,088 acres (Service 2019). The combined impacts of urban expansion and agriculture (primarily conversion to cropland) are expected to affect 5-15 % of the suitable habitat in the Northern Plains. This assessment of land use effects includes cautions because these effects were compared to areas of potential suitable habitat, and our assessment of suitable habitat was very broad. Not all potentially suitable habitat is occupied by ABBs; therefore, this analysis may underestimate the impacts of land use changes. Additional cautions are related to our limited ability to quantify some potential future effects. For example, uncommon increases in crop prices could increase incentives for conversion of grassland to row crops to levels beyond the assumptions used in the two scenarios.

Recent development and potential expansion of wind energy projects could also add to impacts from other land use changes. The construction of wind turbines, roads, and powerlines has direct permanent habitat impacts and fragments the remaining habitat. The operation of wind turbines also has potential for direct take through ABB collisions with the blades. Development of roads and powerlines may promote conversion of grassland to irrigated agriculture near wind facilities.

Future land use effects related to wind power were not factored into land use scenarios because we did not have estimates of future development or total areas that may be affected by wind projects, and there are no studies available to evaluate the actual effects of wind projects on ABBs. Within the Southern Plains analysis areas, the current area of wind projects is relatively small (2,715 wind turbines, see Table 1) relative to the large area (19,995,088 acres) and there is more limited potential for expansion. Less than 10 percent of the Southern Plains analysis areas have annual average wind speeds of 6 meters/second (m/s) or greater at 30 meters height that are recommended for wind development. There is greater potential for wind energy development in the Northern Plains analysis areas and about twice as many wind turbines are FAA registered there, relative to the Southern Plains analysis areas (see Table 1). Nearly all of the Northern Plains analysis areas have annual average wind speeds of 6 m/s or greater at 30 meters height and the Niobrara River Analysis Area has the highest concentration of wind turbines (see Figure 2). There are 4,637 wind turbines registered in the Northern Plains analysis areas (see Table 1), but we do not know what areas, or what percentage of the suitable habitat in Northern Plains analysis areas, may be affected by wind projects in future years. The Service intends to do further evaluation of potential effects of wind projects and welcomes any additional information on the subject.

Climate change is expected to impact the ABB within the action area, provided average air and soil temperatures increase, leading to decreased suitability of habitat for breeding and survival. This is a summary of climate-related risks, and additional information is available in the SSA Report (Service 2019). The SSA Report's chapter 3 summarizes general climate risks, chapter 4 includes current risks, and chapter 5 covers future risks (Service 2019). Under both the Representative Concentration Pathways (RCP) 4.5 and 8.5 emissions scenarios (described in Chapter 5 of the SSA Report), a majority of the Southern Plains analysis areas are expected to be near or exceed summer mean-maximum threshold temperatures (95 °F) by 2039, with potential to extirpate ABBs from most or all Southern Plains populations. Within the mid-century time period, all Southern Plains analysis areas are expected to exceed threshold temperatures under both the RCP 4.5 and 8.5 emissions scenarios, likely resulting in extirpation of the ABB from these areas. The effects of climate change, such as increasing temperatures, changes in precipitation, increased evaporative losses, and prolonged droughts, are known to stress and sometimes kill individual ABBs and, therefore, are likely to reduce reproductive success. Overall, we consider these factors threats to ABB populations, but the impacts are currently limited to the southernmost parts of the range. However, future projections indicate that ABBs have a high risk of extirpation throughout the Southern Plains analysis areas and in large portions of the Northern Plains analysis areas by the end of the mid-century time period due to these effects of climate change.

CONCLUSION

After reviewing current status of the ABB, environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's Opinion that the 4(d) rule will not jeopardize the continued existence the ABB.

The incidental take excepted from take prohibitions through the 4(d) rule could total about 1,295,668 acres of occupied or potentially occupied ABB habitat in the Southern Plain analysis areas. The actual impacts are likely to be much less because projected activities were assumed to be in occupied ABB habitat and many of these would likely be in unfavorable habitat. Very little incidental take would be excepted from take prohibitions in the New England and Northern Plains analysis areas and would be limited to incidental take resulting from actions related to grazing and wildlife management. We estimate less than 10 percent of grazing lands have any significant soil disturbance on an annual basis and much of this disturbance is temporary.

Relatively few grazing actions are currently requesting consultation or permits for incidental take of ABBs. Some consultations with the Bureau of Land Management, Bureau of Indian Affairs, U.S. Army Corps of Engineers, U.S. Forest Service, and Natural Resource Conservation Service have included grazing actions, but the grazing is moderated or conditioned to avoid most incidental take. Future federal actions will continue to require section 7 consultation. Some ABBs may be disturbed or killed during ground disturbance activities, but these activities will not have a population-level effect due to the limited area affected when compared to the species overall range. Most of the take excepted from take prohibitions by the 4(d) rule is related to actions in the Southern Plains analysis area and these populations are expected to be extirpated within 20-30 years due to climate-related changes. The actions related to exceptions from take prohibitions provided through the 4(d) rule are unlikely to have any effect on projected climate changes or future populations in the Southern Plains. Therefore, our analysis indicates that the 4(d) rule will not appreciably reduce the survival and recovery of the ABB.

All of the activities identified in the sections above can negatively impact the ABB; however, the cumulative impact of all of these projects is relatively small, the amount of take authorized has been small, and the loss of habitat is not great when considered on the landscape scale. Even though the action area will be impacted, it will continue to provide suitable habitat for ABB.

We base this conclusion on the following:

- Since the Recovery Plan was developed in 1991, numerous other ABB populations have been discovered, and the recovery objective of reducing the immediate threat of extinction through discovery or establishment of new populations has been met (Service, 2008).
- Although the small population in the Red River Analysis Area, on the periphery of the range, may be declining, available evidence indicates that other populations of ABB are relatively stable in Nebraska, South Dakota, Oklahoma, Arkansas, Kansas, and Rhode Island.
- Given that the ABB range totals over 12 million acres of favorable habitat and over 33 million acres of potentially suitable habitat throughout, the overall percentage of range wide ABB habitat that may be impacted by the proposed 4(d) rule (about

2,403,739 acres) is significantly less than the entire range where ABB occurs (Service, 2019) and most (about 87%) of the impacts are expected to be temporary.

- Southern Plains populations are supported by large areas of potential habitat (about 19,995,088 acres of potential habitat) and the actions potentially related to the proposed 4(d) rule impact less than 7 percent of the suitable habitat. Less than 2 percent of the suitable habitat disturbance is expected to be permanent. Climate-related impacts are the primary risk for future ABB populations in the Southern Plains and the proposed 4(d) rule does not affect those risks.
- Protection of ABB habitat in Northern analysis areas is essentially the same as the current protections provided as an endangered species. Only grazing/ranching are excepted in New England and this exception in addition to wildlife management by state and federal agencies are excepted in the Northern Plains populations.

The conclusion of this Opinion is based on full implementation of the action as described in the Description of the Proposed Action section of this document, including all conservation measures that were incorporated.

After reviewing the current status of the ABB, environmental baseline, effects of the Action, and cumulative effects, it is the Service's Opinion that the Action, as proposed, is not likely to jeopardize the continued existence of the ABB. The Service has not proposed or designated critical habitat for this species; therefore, none is affected.

This Opinion has evaluated major categories of actions that may affect the ABB, but for which incidental take is not prohibited. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions. Federal agencies may rely on this Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the framework specified in section 1.3 of this Opinion, which provides a process by which agencies may verify that their proposed actions do not include activities that would cause prohibited incidental take. Prohibited incidental take requires either a separate consultation (federal actions) or an incidental take permit (non-federal actions).

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without 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 further defined (50 CFR §17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR §17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and

section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take

Incidental take of the ABB, in the form of harm, is reasonably certain to occur as a result of the proposed action. Harm to individual beetles may occur from construction activities conducted within occupied areas and through activities that may kill individual ABBs and alter the suitability of their habitats. Take of ABBs is anticipated to occur on all affected occupied habitat (measured in acres) within the project area. For the purposes of this Opinion, the Service uses habitat as a surrogate for take by defining incidental take in terms of the number of acres disturbed. Rational for using habitat as a surrogate for take is provided in the Status of the Species section above.

Summary of Take Anticipated

For purposes of this Opinion, the Service defines incidental take in terms of the number of acres impacted. The Service considers using acres of habitat disturbed as an appropriate surrogate based on the information provided above. The Service anticipates that up to about 2,403,739 acres of ABB habitat may be taken by actions associated with incidental take excepted by the 4(d) rule in the next 30 years (see Table 1). Given that the ABB range totals over 12 million acres of favorable habitat and 33,303,055 acres of potentially suitable habitat throughout, the overall percentage of range wide ABB habitat that may be impacted is less than 8 percent of the entire range where ABB occurs (Service, 2019) and most (about 87%) of the impacts are expected to be temporary (see Table 1). Less than 2 percent of the potentially suitable habitat is projected to be affected by permanent impacts over the next 30 years.

Effect of the Take

In the accompanying Opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the American burying beetle. Although we anticipate incidental take to occur, the 4(d) rule tailors the Act's protections to allow activities that only have minor or temporary effects and are unlikely to affect the resiliency of American burying beetle populations or viability of the species.

Reasonable and Prudent Measures and Terms and Conditions

The actions evaluated in this Opinion include those activities resulting in incidental take that is are excepted from take prohibitions through the 4(d) rule, therefore reasonable and prudent measures and terms and conditions to minimize incidental take are not issued under this biological opinion.

As with any activity, federal or non-federal, the project proponent or federal agency should ensure that their project does not result in prohibited take. To assist with making this determination for ABB related to the 4(d) rule, the Service has developed a determination

key in its Information, Planning and Consolation System (IPaC) and provided guidance on the Service's Oklahoma Ecological Services Field Office website https://www.fws.gov/southwest/es/oklahoma/ABB_Add_Info.htm. The Service will monitor incidental take reported through consultations and projects submitted for review. We will combine this information with habitat status assessments (acres of habitat loss) conducted during a recovery plan revision and five-year reviews to determine if the amount or extent of incidental take in this biological opinion is exceeded.

REINITIATION NOTICE

This concludes formal consultation regarding the U.S. Fish and Wildlife Service's finalization of a special rule under the authority of section 4(d) of the Act for the ABB. As provided in 50 CFR §402.16, reinitiation of 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 biological opinion or written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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