United States Department of the Interior

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In Reply Refer To:
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April 1, 2010

Memorandum

To: John Melhoff, Field Manager, BLM, Tulsa, OK
Robert Mitchell, Wild Horse and Burro Program Supervisor, BLM, Moore, OK

From: Field Supervisor, Oklahoma ES Field Office, R2, Tulsa, OK Kennit D. Frazier

Subject: Wild Horse Long Term Holding Facility Programmatic Formal Consultation and Biological Opinion

This document transmits the U. S. Fish and Wildlife Service's (Service) programmatic biological opinion (PBO) based on the Bureau of Land Management (BLM) Wild Horse Long-Term Holding Facility (WH-LTHF) Program's programmatic biological assessment (PBA) regarding WH-LTHF establishment and operation and its effects on the American burying beetle (ABB) *Nicrophorus americanus* and its habitat in eastern Oklahoma in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Your August 17, 2009, memorandum and August 14, 2009, PBA requesting formal consultation was received on August 17, 2009.

This biological opinion is based on information provided in the August 14, 2009, PBA, the April 21, 2008, Consultation Agreement and Cooperative Agreement framework letter [RE: 1780 (93000)], telephone conversations with Phil Keasling, field investigations, and other sources of information. It is the intent of the BLM to address the possible location of WH-LTHFs in any, or all, of the current ABB counties in Oklahoma (22 counties) and in any future county where ABBs are documented to occur (reasonably likely in an additional 12 counties) in Oklahoma, for a total of 34 counties. The ABB is the only species of concern addressed in this PBO. All other listed species will be dealt with on a project specific basis as each individual WH-LTHF action is initiated. A complete administrative record of this consultation is on file at the Oklahoma Ecological Services Field Office.

We appreciate the opportunity to comment on this project. If you need further information, please contact Chris O'Meilia or Hayley Dikeman of this office at 918-581-7458.

cc: Regional Director, FWS, Albuquerque, NM
Manhattan Ecological Services Field Office, Attn: Dan Mulhern, Manhattan, KS

BIOLOGICAL OPINION

CONSULTATION HISTORY

A detailed discussion of the consultation history has been provided in the PBA (August 14, 2009) by BLM.

DESCRIPTION OF PROPOSED ACTION

As directed by Congress under the Wild Free-Roaming Horses and Burros Act of 1971, the BLM protects, manages, and controls wild horses and burros that roam Western public rangelands. The BLM manages these feral animals as part of its overall multiple-use mission across 253 million acres of public lands. Feral animals are those that have escaped from domestication and returned, partly or wholly, to a wild state. Wild horses are not a native species. American wild horses are descended from domesticated horses brought over by European explorers that have adapted successfully to the Western range.

One of the BLM's key responsibilities under the 1971 law is to determine the appropriate management level of wild horses and burros on the public rangelands. These animals have virtually no natural predators and their herd size can double approximately every 4 years. As a result, nearly 37,000 wild horses and burros roam BLM-managed lands in 10 Western states. This number exceeds by over 10,350 the recommendation that BLM has suggested for an appropriate number of horses, given other public rangeland resources and uses (BLM 2010).

When an overpopulation of wild horses and burros exists on public lands, the BLM gathers excess animals and offers them to the general public for adoption (or sale). The BLM presents these animals at adoption events and at BLM facilities throughout the United States.

The BLM also directly sells animals that are more than 10 years old and those younger that have been passed over for adoption at least three times. These animals are located in the BLM's WH-LTHF and short-term corrals. Off of western public rangelands, there are more than 34,000 additional wild horses and burros that are fed and cared for at short-term corrals and WH-LTHF (BLM 2010). Specifically, as of November 2009, there were approximately 12,500 in short-term corrals and 22,000 in Midwestern WH-LTHF (BLM 2010).

The Proposed Action under consideration is the continued operation and possible expansion of the BLM WH-LTHF program in Oklahoma; more specifically, in Oklahoma counties where the American burying beetle (ABB) is known to be present. Contracted WH-LTHFs are used for the long-term care and maintenance of wild horses which have been removed from western rangelands.

The BLM intends, for the purposes of this programmatic effort, to address the possible location of WH-LTHFs in any, or all, of the current ABB counties in Oklahoma (22 counties) and in any additional Oklahoma counties where ABBs are documented to occur (reasonably likely in an additional 12 counties) for a total of 34 counties.

General WH-LTHF actions include, but may not be limited to:

1. Contracts for new facilities,

2. Re-bidding of expired contracts, and

3. Contract modifications of existing facilities (i.e., anything affecting the acreage and/or management of the facilities).

An example of a Request for Proposals (RFP) is contained in the PBA and was provided to demonstrate BLM's contractual control over management of the WH-LTHFs. BLM asserts that they are constrained by the language in the RFP with respect to day-to-day management practices used by the ranch owners on their particular WH-LTHF. Subsequently, the existing WH-LTHFs vary in size, stocking rate, maximum number of wild horses and management.

Currently, BLM WH-LTHFs have a maximum capacity of approximately 20,000 wild horses grazing on approximately 140,000 acres of privately owned facilities in the tallgrass prairies of Oklahoma. The oldest facility in Osage County has been in operation for approximately 20 years.

Specific actions of the WH-LTHF program will include:

The WH-LTHF are established to meet the feeding, watering, and sheltering needs of wild horses on private lands deemed acceptable through a request for proposals (RFP) selection process. Typically, the wild horses are then maintained on the chosen facility until death. Generally, once a mature wild horse has been shipped to the facility it stays on the facility. Wild horses have been known to live for 20 years or more after being stocked on their respective facility. Several animals have been recorded as 30 years old, or older, upon documentation of their deaths. The initial stocking of wild horses on a new facility is accomplished over a period of several weeks. Multiple trucks deliver wild horses to the facility each week to reach the stocking capacity of that particular facility. There are approximately 35 horses per truck. Upon arrival, the wild horses are placed into a pen (size varies based on the specific WH-LTHF) and held in the pen for approximately 2 weeks to recover from the stress of shipping and to acclimate to the new environment, before being released into the larger area of the WH-LTHF.

Gelding and mare wild horses are physically separated by placement on different WH-LTHFs. Many of the mares will be dry but many could be pregnant and give birth at the facility. The resulting colts are removed from the facility at approximately 6 months of age and made available to the public through BLM's Adopt a Wild Horse and Burro Program.

Wild horses are grazed yearlong on the WH-LTHFs. Stocking rates vary at each WH-LTHF (Table 1). WH-LTHFs have no specific grazing management program requirements. Management of wild horse grazing is left to the discretion of the landowner of the WH-LTHF. The ranch/facility managers can move horses around in pastures within the larger WH-LTHF as they feel necessary.

Table 1. Existing Oklahoma WH-LTHFs and respective stocking rates

WH-LTHF Name	Acres	Facility Capacity	Stocking Rate
Bartlesville	19,155	2,300	8.33
Catoosa	9,446	2,000	4.72
Foraker	19,295	2,500	7.72
Gray Horse East	15,211	2,485	6.12
Gray Horse West	11,117	1,015	10.95
Herd	8,203	1,000	8.20
Hominy	6,742	1,059	6.37
Hulah	17,857	2,648	6.74
Pawhuska	24,292	3,400	7.14
Strohm	8,550	1,000	8.55
	139,868	19,407	7.21

Supplemental feeding has always been a requirement in the contracts and continues to be used to supplement daily forage requirements during specific times of the year. As outlined in the RFP, supplemental feed is usually fed during the fall and winter. Supplemental feeding would be warranted should the wild horses exhibit a body condition class of thin to poor (refer to "The Horse and Burro Body Fat Worksheet" materials provided in the PBA). The contract states that the horses must be sustained in good condition (Condition #4 – Moderately THIN; refer to Appendix D in the PBA).

The contract requirements also include specifications for structures and facilities such as corrals, chutes, runways, as well as the requirements for pastures, supplemental feed, feed supplements, and water. Any proposed surface disturbing activities associated with the initial stocking and/or continued operation of the WH-LTHFs would require an ABB avoidance effort (bait-away or trapping) should that disturbance be 1.2 acres or larger. The BLM works with the facility operators to minimize the need for new surface disturbing activities and to keep any such activity below the 1.2 acre threshold which triggers the need for ABB field efforts (presence/absence trapping, baiting away and/or trapping and relocation). These ABB measures will be considered in each site specific WH-LTHF action as they are reviewed for compliance with this programmatic effort.

Action Area

The Service recognizes the action area (i.e., area that may be directly or indirectly affected by proposed action) to be the 22 counties currently documented with occurrences of ABB (Table 2) and at the time of discovery, all counties where future survey efforts identify occurrence of the ABB in Oklahoma.

Table 2. Counties in which ABB occurrence is confirmed.

STATE	COUNTY NAME	ABB CONFIRMED
OKLAHOMA	ATOKA	ENDANGERED (1,B)
OKLAHOMA	BRYAN	ENDANGERED (1,B)
OKLAHOMA	CHEROKEE	ENDANGERED (1,B)
OKLAHOMA	CHOCTAW	ENDANGERED (1,B)
OKLAHOMA	COAL	ENDANGERED (1,B)
OKLAHOMA	CRAIG	ENDANGERED (1,B)
OKLAHOMA	HASKELL	ENDANGERED (1,B)
OKLAHOMA	HUGHES	ENDANGERED (1,B)
OKLAHOMA	JOHNSTON	ENDANGERED (2,B)
OKLAHOMA	LATIMER	ENDANGERED (1,B)
OKLAHOMA	LE FLORE	ENDANGERED (1,B)
OKLAHOMA	MCCURTAIN	ENDANGERED (1,B)
OKLAHOMA	MCINTOSH	ENDANGERED (1,B)
OKLAHOMA	MUSKOGEE	ENDANGERED (1,B)
OKLAHOMA	NOWATA	ENDANGERED (1,B)
OKLAHOMA	OSAGE	ENDANGERED (1,B)
OKLAHOMA	PITTSBURG	ENDANGERED (1,B)
OKLAHOMA	PUSHMATAHA	ENDANGERED (1,B)
OKLAHOMA	ROGERS	ENDANGERED (1,B)
OKLAHOMA	SEQUOYAH	ENDANGERED (1,B)
OKLAHOMA	TULSA	ENDANGERED (1,B)
OKLAHOMA	WAGONER	ENDANGERED (1,B)

[1] *Historical Range – According to specimen records, the recovery plan and available life history information, this county is within the documented historical range of the American burying beetle.*

[2] *Non-Historical Range – This county is not within the documented historical range of the American burying beetle. However, suitable habitat is present and this county is adjacent to at least one county with current positive findings, suggesting American burying beetles are likely to be present within this county.*

[A] *Unconfirmed – Surveys within the last 15 years are lacking or insufficient to determine presence of the American burying beetle. However, suitable habitat is present and this county is adjacent to at least one county with current positive findings. In some instances, occurrences of American burying beetles have been reported by reputable individuals, but identification has not been verified by a Service biologist or trained entomologist.*

[B] *Confirmed – Surveys within the last 15 years have documented the presence of the American burying beetle within the county.*

The 12 counties that are currently identified as having no documented ABB occurrence, but have the potential of having ABBs found due to suitable habitat, proximity to known occurrences of the species and are counties occurring with the historic range of the ABB are included in Table 3.

Table 3. Counties in which ABB occurrence is unconfirmed, but the species potentially occurs due to suitable habitat and proximity to other known occurrences in adjacent counties.

STATE	COUNTY NAME	ABB UNCONFIRMED
OKLAHOMA	ADAIR	ENDANGERED (1,A)
OKLAHOMA	CREEK	ENDANGERED (1,A)
OKLAHOMA	DELAWARE	ENDANGERED (1,A)
OKLAHOMA	MARSHALL	ENDANGERED (2,A)
OKLAHOMA	MAYES	ENDANGERED (1,A)
OKLAHOMA	OKFUSKEE	ENDANGERED (1,A)
OKLAHOMA	OKMULGEE	ENDANGERED (1,A)
OKLAHOMA	OTTAWA	ENDANGERED (1,A)
OKLAHOMA	PAWNEE	ENDANGERED (2,A)
OKLAHOMA	PONTOTOC	ENDANGERED (2,A)
OKLAHOMA	SEMINOLE	ENDANGERED (2,A)
OKLAHOMA	WASHINGTON	ENDANGERED (1,A)

[1] *Historical Range – According to specimen records, the recovery plan and available life history information, this county is within the documented historical range of the American burying beetle.*

[2] *Non-Historical Range – This county is not within the documented historical range of the American burying beetle. However, suitable habitat is present and this county is adjacent to at least one county with current positive findings, suggesting American burying beetles are likely to be present within this county.*

[A] *Unconfirmed – Surveys within the last 15 years are lacking or insufficient to determine presence of the American burying beetle. However, suitable habitat is present and this county is adjacent to at least one county with current positive findings. In some instances, occurrences of American burying beetles have been reported by reputable individuals, but identification has not been verified by a Service biologist or trained entomologist.*

[B] *Confirmed – Surveys within the last 15 years have documented the presence of the American burying beetle within the county.*

Conservation Measures

Conservation Measures, when used in the context of the ESA, represent actions pledged in the project description that the action agency or the applicant will implement to further the recovery of the species under review. The beneficial effects of the conservation measures are taken into consideration for both jeopardy and incidental take analyses. Current, ongoing conservation measures implemented to benefit the ABB on existing WH-LTHFs including,

1. The supplemental feeding program will help to minimize and avoid some of the impacts to ABBs by reducing the range forage requirement, lowering the utilization rate and resulting in a decrease in the grazing pressure on the residual forage grasses during the winter months.

2. BLM will not ship replacement or expansion horses during periods of severe drought. Drought conditions will be assessed on a case-by-case basis using the best methods and data available.

3. The BLM will work with the facility operators to minimize the size of new surface disturbing activities in order to keep such activity below the 1.2 acre threshold which triggers the need for ABB field efforts (presence/absence trapping, baiting away and/or trapping and relocation).

4. Contribution of BLM funds for ABB conservation efforts, specifically BLM commits to providing up to $200,000 at a rate of $1/acre as each acre of WH-LTHF (in ABB habitat in Oklahoma) comes under the PBO (new contracts, contract rebids and contract modifications/expansions). The corresponding acreage threshold will be 200,000 acres; which, if reached, would trigger reinitiation of ESA section 7 consultation. The dollar amounts are to be provided on a fiscal year (FY) basis as per the following estimated schedule:

    a. The BLM funds would be provided in increments not to exceed $40,000 in any one FY. For the first 2 years of the agreement (FY 2008 & 2009), the BLM would contribute the maximum $40,000 per FY amount. The third year contribution (FY 2010) will include funds corresponding to the balance of any remaining acreage under contract from the FY 2008 and/or 2009 years (i.e., in excess of 80,000 acres) and any new acres coming under the PBO during FY 2010 not to exceed the $40,000 maximum-yearly amount. Contributions each year thereafter would correspond to any acres added during that particular year via new contracts, rebids, etc., occurring during that year.

    b. The BLM agrees to transfer the aforementioned funds to The Oklahoma Chapter of The Nature Conservancy for purposes of ABB conservation in the tallgrass-prairie habitats of Oklahoma. The BLM and the Service will cooperatively research possible means of monetary transfer and develop the necessary documents.

The BLM has committed to continuing these actions to the benefit of ABB conservation and recovery actions.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Species and Designated Critical Habitat Description

The ABB was proposed for federal listing in October 1988 (53 FR 39617) and designated as an endangered species on July 13, 1989 (54 FR 29652). Critical habitat has not been designated for the ABB. The draft recovery plan was issued on July 25, 1991, and the final recovery plan was

signed on September 27, 1991. The ABB's species recovery priority number is 5c. A rank of 5c indicates that the listed taxon is a full species, facing a high degree of threat with a low recovery potential. The suffix "c" connotes conflict with construction or other development projects (48 FR 43098). The Service completed a 5-year review of the listing status in 2008. The concluding recommendation of the 5-year review was to retain the species status as endangered.

The ABB is the largest species of its genus in North America, measuring 1 inch to 1.4 inches long. The hardened elytra are smooth, reflective black, and each elytron has two scallop shaped orange-red markings. The pronotum (hard back plate of the front portion of the thorax of insects) over the mid-section between the head and wings is circular in shape with flattened margins and a raised central portion. The most diagnostic feature of the ABB is the large orange-red marking on the raised portion of the pronotum, a feature shared with no other members of the genus in North America (USFWS 1991). The ABB also has orange-red frons and a single orange-red marking on the top of the head (triangular in females and rectangular in males). Antennae are large, with notable, orange club-shaped tips.

Distribution and Abundance

Historically the geographic range of the ABB encompassed over 150 counties in 35 states, covering most of temperate eastern North America (USFWS 1991, Peck and Kalbars 1987, USFWS 2008; Appendix 1). Records are known from Texas (single record c. 1935) in the south, north to Montana (single record in 1913) and the southern fringes of Ontario, Quebec, and as far east as Nova Scotia and Florida (Appendix 1). Documentation is not uniform throughout this broad historical range. More records exist from the Midwest into Canada and in the northeastern United States than from the southern Atlantic and Gulf of Mexico region (USFWS 1991). The ABB has disappeared from over 90 percent of its historic range.

At the time of listing, known populations were limited to Block Island, Rhode Island, and a few counties in eastern Oklahoma. Currently, the ABB is known to occur in only eight states rangewide: on Block Island off the coast of Rhode Island, Nantucket Island off the coast of Massachusetts, eastern Oklahoma, western Arkansas, the Sand Hills region in north-central Nebraska, the Chautauqua Hills region of southeastern Kansas (Sikes and Raithel 2002), south central South Dakota (Ratcliffe 1996, Bedick *et al.* 1999), and northeast Texas (Godwin 2003). Less than 7 percent of the land within the ABB range in Oklahoma exists in public ownership. Public landowners include the Service, U.S. Army Corps of Engineers, Bureau of Indian Affairs, Bureau of Reclamation, U.S. Department of Defense, U.S. Forest Service, Oklahoma Department of Wildlife Conservation, Oklahoma Department of Tourism, and Oklahoma State School Lands Commission (U.S. Geological Survey 1995).

Some private conservation lands owned by The Nature Conservancy within eastern Oklahoma also support ABB populations. Most existing populations, however, are located on private land. Populations known to exist on public land include: Ouachita National Forest, Arkansas / Oklahoma; Ozark-St. Francis National Forests, Arkansas; the McAlester Army Ammunition Depot and Defense Ammunition Center, Oklahoma; Camp Gruber, Oklahoma; Fort Chaffee,

Arkansas; Sequoyah National Wildlife Refuge, Oklahoma; Block Island National Wildlife Refuge, Rhode Island; Valentine National Wildlife Refuge, Nebraska; and Camp Maxey, Texas.

Abundance of the ABB range-wide varies significantly within and between known populations and within and between years. The monitoring of some populations show stable or slightly increasing trends in abundance, while other populations indicate declining abundance (USFWS 2008). Holloway and Schnell (1997) found significant correlations between the numbers of ABBs caught in traps and the biomass of mammals and birds, irrespective of the predominant vegetation.

Numerous ABB surveys have been conducted throughout eastern Oklahoma. The majority of these surveys are driven by the need to protect ABBs from specific soil disturbance actions associated with development projects. Therefore, most survey data is temporally and spatially random, with only a small portion of the survey data from standard survey efforts. Consequently, the number of trapnights varies among counties and years, ranging from 24 trap nights in Tulsa County to 17,388 in Muskogee County. Presently, eastern Oklahoma contains one large concentration of ABBs within their historic range, at Camp Gruber in Muskogee County. In 2007, a total of 676 ABBs were captured in 1,305 trapnights at Camp Gruber. Smaller concentrations of ABBs in Oklahoma include the McAlester Army Ammunition Depot and Defense Ammunition Center in Pittsburg County, the four-county area of Atoka, Coal, Hughes, and Pittsburg counties and the Tallgrass Prairie Preserve in Osage County. In 2009, a survey effort of 2,472 trapnights resulted in 415 ABB captured on the TNC's Tallgrass Prairie Preserve.

Habitat

Feeding Habitat

ABBs are considered feeding habitat generalists and have been successfully live-trapped in several vegetation types including native grasslands, grazed pasture, riparian zones, coniferous forests, mature forest, and oak-hickory forest, as well as a variety of various soil types (Creighton *et al.* 1993a, Lomolino and Creighton 1996, Lomolino *et al.* 1995, NatureServe 2009, USFWS 1991). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (Ratcliffe 1996, USFWS 1991).

Reproductive Habitat

While studies indicate that the ABB is a habitat generalist in terms of feeding, it is likely more stenotopic when selecting burial sites for breeding. In Oklahoma, ABBs are found within a mixture of vegetation types from oak-hickory and coniferous forests on lowlands, slopes, and ridgetops to deciduous riparian corridors and pasturelands in the valleys (Service 1991, Creighton *et al.* 1993a). However, for reproduction, soil conditions must be conducive to excavation by ABBs (Anderson 1982, Lomolino and Creighton 1996). In 1996, more than 300 specimens were captured in Nebraska habitats consisting of grassland prairie, forest edge, and

scrubland (Ratcliffe 1996). These surveys have found certain soil types such as very xeric (dry), saturated, or loose, sandy soils to be unsuitable for carcass burial and thus are unlikely habitats. At Fort Chaffee in Arkansas, Schnell and Hiott (2002) also noted that ABBs tended to avoid soils with less than 40 percent sand, greater than 50 percent silt, and greater than 20 percent clay. Lomolino and Creighton (1996) found reproductive success to be higher in forested sites than grassland sites. Carcasses tended to be buried deeper in the soil at grassland sites, as compared to forested sites (e.g., just below the litter layer).

Life History

The ABB is an annual species and typically reproduces once in its lifetime. It competes with other invertebrate species, as well as vertebrate species, for carrion. Although ABBs are considered feeding habitat generalists, they are believed to be more selective regarding breeding habitat.

Active Period

In Oklahoma, ABBs are typically active at night from mid-May to late-September (May 20-September 20) when nighttime ambient temperatures are consistently above 60°F. Nightly activity is most prevalent from 2 to 4 hours after sunset (Walker and Hoback 2007). ABB activity decreases with weather events, such as rain and strong winds. During the daytime ABBs are believed to bury under the vegetation litter. During late May and early June, ABBs secure a mate and carcass for reproduction. About 12 days afterward (once larvae enter pupae phase), adult ABBs emerge and search for food.

Inactive Period

During the inactive period, when the nighttime ambient temperature is consistently below 60°F, ABBs bury themselves into the soil and become inactive (USFWS 1991), typically September 21- May 19 in Oklahoma. Recent studies indicate that ABBs bury an average depth of 2.4 inches (Schnell *et al.* 2008). Habitat structure (i.e., woodland vs. grassland) does not appear to be an influencing factor.

Preliminary data suggest that significant mortality occurs during the overwintering inactive period (Bedick *et al.* 1999). Winter mortality has only recently begun to be investigated, but may range from 25 percent to about 70 percent depending on year, location, and availability of carrion in the fall (Schnell *et al.* 2008, Raithel unpubl. Data 1996-2006).

Feeding

When not involved with brood rearing, adult food sources include an array of available carrion, as well as capturing and consuming live insects. *Nicrophorus* species are capable of finding a carcass between one and 48 hours after death at a distance up to 2 miles (Ratcliffe 1996). Success in finding carrion depends upon many factors, including availability of optimal habitats for small vertebrates (Lomolino and Creighton 1996), density of competing invertebrate and

vertebrate scavengers, individual searching ability, reproductive condition, and temperature (Ratcliffe 1996).

Adult ABBs in search of carrion move an average of 0.7 miles per night (Creighton and Schnell 1998). Creighton *et al.* (1993b) recorded ABBs traveling as much as 2 miles during one night. Creighton and Schnell (1998) found that the mean distance recaptured ABBs moved from their original site of capture was 1.66 miles, with a minimum distance of 0.01 mile in one night to a maximum distance 6.2 miles over a 6-night period. Bedick *et al.* (1999) indicated that ABBs may travel distances up to 3.72 miles in a single night.

By moving relatively long distances among different habitat types, ABBs increase the chance of encountering proper sized carcasses, but also increase exposure to a diversity of natural and unnatural sources of potential adverse impact, including predation, insecticides, commercially available insect traps, and nocturnal light pollution. The probability of individual ABBs being subjected to these types of hazards also increases as areas become more developed (Lomolino and Creighton 1996).

Reproduction

Reproductive activity occurs between mid-May and mid-August and commences once a suitable carcass is found on which to feed and lay eggs. Both parents often participate in the rearing of young with care by at least one parent, usually the female, which is critical for larval survival (Ratcliffe 1996). This is a rare and highly developed behavior in insects, known only among bees, ants, wasps, termites, and a few scarab beetle species. The pair buries appropriately-sized carrion, about 3.5-7.0 ounces in weight, within a brood chamber constructed around the carcass. Prior to carcass burial, ABBs may move the carrion laterally for up to 3 feet (USFWS 1991).

Eggs are laid in the soil beside the carcass. Brood sizes vary between 3-31 individuals (USFWS 1991), with a positive correlation between carrion weight and number of larvae (Kozol 1990). The larvae pupate and emerge as adults in about 48-60 days. Generally, the ABB produces only one brood per year and these newly hatched adults overwinter to reproduce the following year. Occasionally the emerging generation of adults succeeds in producing another brood if summers are long and warm (USFWS 1991).

Movement

The ABB readily moves between differing habitats (Creighton and Schnell 1998, Lomolino *et al.* 1995). Nightly movement of ABBs ranges from 0.101 to 1.03 miles (0.16 – 1.66 km). Creighton and Schnell (1998) conducted a study on movement patterns of ABBs at Camp Gruber and Fort Chaffee in 1992 and 1993. They recaptured 68 ABBs over a 12-night period. Of those 68, 23 (29.5 percent) were recaptured at a site different then the original site of capture. The mean distance moved of the 23 recaptured ABBs over the 12-night sampling period was 1.21 miles (1.95 km) for each ABB [0.101 miles (0.16 km) per night per ABB]. The minimum and maximum distance moved by an individual recaptured ABB was 0.16 mile (0.25 km) in 1 night and 4.3 miles (6.5 km) in 5 nights [0.8 miles (1.29 km) per night], respectively. Six ABBs were

recaptured two or three times. The mean movement for these six ABBs was 6.2 miles (10 km) over 6 nights [1.03 miles (1.66 km) per night] over the entire sampling period. The maximum distance moved by one of these six was 0.76 mile (1.23 km) in one night.

Bedick *et al.* (2004) reported average nightly movements of 0.62 mile (1.0 km) with 85 percent of recaptures moving distances of 0.31 miles per night. Schnell *et al.* (1997-2003) annually determined the average nightly movements of the ABB to be 0.62 miles (1.0 km), using marked individuals over a 9-year period at Camp Gruber. The smallest average nightly movement for any given active season over that same period was 0.52 miles (0.84 km). Schnell *et al.* (1997-2006) reported a one day movement of 2.6 miles (4.25 km); previously the greatest distance moved was 1.78 miles (239 km, Creighton and Schnell 1998). While this data could be interpreted to imply that an ABB could move 95 miles [153 km, 0.62 (mean nightly movement) times 154 days (May 20 – September 20)] during the active season, the Service does not believe this is an accurate interpretation. Mark and recapture studies at Camp Gruber and Fort Chaffee have yet to find any ABBs that have moved between these installations, a distance of about 54 miles (87 km, Schnell *et al.* 1997-2003, and Schnell *et al.* 1997-2005). Even if ABBs moved such long distances, the Service assumes it is unlikely ABBs move in such a consistently linear direction. Considering the ABB's mobility, small size, recorded movement distances, and distance from which they can detect carrion, the Service considers presence/absence surveys to be conservatively effective only over a distance of 5 miles.

Population Dynamics

Population size

Most standard techniques used to estimate population size assume that marked and unmarked individuals are equally likely to be captured, and that a substantial number of the animals remain in the trappable population from one trapping period to the next. The high turnover of trappable individuals observed in ABBs strongly suggests that the latter portion of this overall assumption is not valid for ABBs, and that conventional methods of estimating population numbers may not be applicable. As such, accurate estimates of absolute or even relative population size or densities of ABBs remain a challenge.

Research on genetic variation within and between populations of ABBs indicate low levels of genetic variation (Kozol *et al.* 1994, Szlanski *et al.* 2000), which is often a result of founder effect, genetic drift and inbreeding and suggests multiple bottleneck events, small population size and high levels of inbreeding.

Variability and Stability

When important resources fluctuate seasonally or annually, population of species dependent on those resources fluctuate. The ABB is an annual species (living for only one year) and the following year's numbers are dependent upon the reproductive success of the previous year.

The land use at Fort Chaffee, Arkansas and Camp Gruber, Oklahoma differs, but each installation maintains a relatively consistent land use pattern of its own through time. However, Schnell *et al.* (1997-2003) and Schnell *et al.* (1997-2005) reported the number of ABBs captured and the location of high density ABB concentrations varies annually at each site. They reported that areas of high concentration appeared to shift annually throughout the sites. Surveys conducted in a given area have resulted in ABB captures during one survey effort but surveys conducted in the same given area within the same active season have resulted in negative ABB captures. These observations of variability indicate that ABBs are annually cyclic and experience a relatively rapid turnover rate in the trappable ABB population, which could be due to factors such as natural mortality, dispersal, and burrowing underground and attending carrion/broods (Creighton and Schnell 1998).

Reasons for Listing / Threats to Survival

In July 1989, the species was federally-listed as endangered based on its drastic decline and elimination over nearly its entire range (54 FR 29652). At the time of listing, the prevailing theory on the ABB's decline was habitat degradation, loss and fragmentation (USFWS 1991).

Data show that species in the family Silphidae are generally widely distributed and occur in many habitat types (Peck and Kaulbars 1987). Even though ABBs are considered feeding habitat generalists they still have disappeared from over 90 percent of their historic range. The Recovery Plan identifies the following issues as potential threats to the ABB: disease/pathogens, DDT, direct habitat loss and alteration, interspecific competition, increase in competition for prey, increase in edge habitat, decrease in abundance of prey, loss of genetic diversity in isolated populations, and agricultural and grazing practices. None of these theories alone adequately explain why the ABB declined while congeneric species are still relatively common rangewide [there are eight sympatric congeners which are not in peril (Sikes and Raithel 2002). There is little doubt that habitat loss and alteration affect this species at local or even regional levels, and could account for the extirpation of populations once they become isolated from others (Kozol 1995, Ratcliffe 1996, Amaral *et al.* 1997, Bedick *et al.* 1999). The prevailing theory regarding the ABBs' decline is habitat fragmentation (USFWS 1991) which reduced the carrion prey base and increased the vertebrate scavenger competition for this prey (Kozol 1995, Ratcliffe 1996, Amaral *et al.* 1997, Bedick *et al.* 1999) due to its relatively large size and specialized breeding behavior (Creighton *et al.* 2009).

Direct Habitat Loss and Alteration

Habitat is the place in which an organism lives, characterized by its physical features or by the dominant plant types (Oxford Dictionary of Biology 2000). Fragmentation is the breakup of extensive habitats into small, isolated patches that are too limited to maintain their species stocks into the indefinite future and reduction of the total amount of habitat available (MacArthur and Wilson 1967, Williamson 1981). There is not a size limitation of disturbed areas which constitute fragmentation. The limiting factor of fragmentation is not only the loss of habitat but the inability to move between undisturbed areas, the quality of the disturbed area species move

around in and through, the spatial structure of the undisturbed habitat and disturbed areas, and the ratio of edge habitat created from fragmentation to the amount of contiguous undisturbed area. Fragmentation of natural habitat that historically supported high densities of indigenous (native) species (made more severe by direct taking, ca. 1900, of birds and other vertebrates) may have been a contributing factor in the decline of ABBs.

Land conversion to agriculture and development, logging, fire suppression, and intensive domestic livestock grazing are the main causes of habitat loss and fragmentation within eastern Oklahoma today. Since European settlement, fires have been largely suppressed within eastern Oklahoma, leading to changes in community types and species composition. Riparian areas and bottomland habitats have been severely degraded not only as a result of conversion to agriculture and logging, but also because of inundation by numerous reservoirs (Ruth 2006). The anthropogenic breakdown of barriers to dispersal also has permitted the invasion of non-indigenous species (Northern Prairie Wildlife Research Center 2006).

Initial fragmentation may have minimal affects on vegetation, and species composition and abundance patterns. But as gaps increase in size and quantity, these gaps become the dominant habitat type in a landscape. Ecosystem functions are more likely to be disrupted at finer scales of fragmentation, although the organisms affected are smaller and the overall process is less noticeable to human observers. Probably some of the strongest effects of fragmentation on ecological processes will turn out to involve the invertebrate community (Didham *et al.* 1996). Invertebrates are critically important in decomposition, nutrient cycling, disturbance regimes, and other natural processes in ecosystems, and they appear to be quite sensitive to disruption of microclimate and other effects of fragmentation. Increased use of land for urbanization and commercial agriculture and forestry has had a demonstrative negative impact on numerous insect species (Pyle *et al.* 1981). Pipelines, roads, well pads, utility corridors, etc. are all actions that result in fragmentation of habitat type creating edge habitat.

Fragmentation of habitat that historically supported high densities of indigenous (native) species, coupled with increased loss (ca. 1900) of birds and other vertebrates, may have contributed to the decline of ABBs by changing the prey species composition and reproductive success. Likewise, by increasing edge habitat, there may have been an attendant increase in the occurrence and density of vertebrate predators and scavengers, such as the American crow *Corvus brachyrhynchos*, raccoon *Procyon lotor*, fox *Vulpes* sp., opossum *Didelphis virginiana*, and skunk *Mephitis* sp., which compete with ABBs for available carrion. These scavengers may range hundreds of feet from edges into forest in eastern North America. Matthews (1995) experimentally placed 64 carcasses in various habitats in Oklahoma where ABBs and *N. orbicollis* had been previously documented, then tracked the organisms that scavenged them. Of the carcasses 83 percent were claimed by ants, flies, and vertebrate scavengers; about 11 percent were claimed by *N. orbicollis*, and only one was claimed by ABBs.

In the Midwest, agriculture, windbreaks, hedgerows, and park development have all provided new "edge" habitat for these scavengers, as well as for domestic and feral animals such as dogs and cats. All of these animals utilize carrion that may be suitable for ABBs (Ratcliffe 1996). In this way, fragmented habitats not only support fewer or lower densities of indigenous species

that historically may have supported ABB populations, but there is more competition for those limited resources among the "new" predator/scavenger community.

Dispersal is more likely to maintain metapopulations in naturally patchy landscapes than in formerly continuous landscapes fragmented by human activity (den Boer 1970). Natural patchy landscapes have less contrast between adjacent patches, whereas anthropogenic fragmentation creates intense, sudden contrast between patches. This edge habitat is a zone where the light, wind, microclimate, and moisture are altered. The effects of these changes extend into different forest types at distances of 450, 656 to 1,640 feet. Climate edge effects may explain why dung and carrion beetle communities in 2.5 and 25 acre forest fragments in Brazil contain fewer species, sparser populations, and smaller beetles than do comparable areas within intact forest (Klein 1989). The drier conditions in small fragments, which are largely edge habitat, may lead to increased fatal desiccation of beetle larvae in the soil.

There is evidence to support a direct correlation between edge, or fragment size, and vertebrate scavenger pressure, with much of this work involving nesting bird populations (Paton 1994, Yahner and Mahan 1996, Suarez *et al.* 1997). Trumbo and Bloch (2000) found that *Nicrophorus* species had significantly greater success in larger woodland plots and attributed this in part to lower vertebrate scavenger success in those areas. Sikes (1996), working with *N. nigrita*, found that most transects laid more than 328 feet from a trail or road had 10 percent or fewer carcasses taken by vertebrates, whereas transects near trails or roads had an average of 85 percent of the carcasses taken by vertebrate scavengers. Schnell *et al.* (1997-2005) found higher numbers and abundances of ABBs within Fort Chaffe and Camp Gruber boundaries than outside.

Although, some mobile species can integrate into a number of habitat patches this does not appear to be the case with the ABB. Schnell *et al.* (1997-2006) found that ABBs avoided clear-cut areas in southeast Oklahoma. Such fragmentation is comparable to pipelines, roads, well pads, utility corridors, commercial and residential development and quarries. The effect of competition, which should be strongly linked to habitat conditions, is likely to be a scale-dependent phenomenon. Tillman *et al.* (1994) suggest that even moderate levels of habitat destruction and fragmentation can 'cause time delayed, but deterministic extinction' of 'dominant competitors in remnant patches'.

The eclectic occurrences and extinction vulnerability of ABBs is likely due to the species having specialized habitat or resource requirements and carrion being a finite resource widely scattered in space and time (Karr 1982, Pimm *et al.* 1988, Peck and Kaulbars 1987). Data available for the ABB on Block Island supports the contention that the primary mechanism for the species' rangewide declines lies in its dependence on carrion of a larger size class relative to that utilized by all other North American Nicrophorus species, and that the optimum-sized carrion resource base has been reduced throughout the species' range over time (USFWS 1991). Further, when resources fluctuate seasonally or annually, species dependent on those resources fluctuate. This population variability predisposes species to extinction. The higher level of fluctuation the greater the chance of extinction. Habitat fragmentation affects these types of species by reducing the number of sites that contain critical resources, and by isolating suitable sites and making them harder to find.

Since the middle of the 19th century, certain faunal species in the favored weight range for ABBs have either been eliminated from North America or significantly reduced over their historic range (USFWS 1991), including, the passenger pigeon *Ectopistes migratorius*, greater prairie chicken *Tympanchus cupido* and wild turkey *Meleagris gallopavo*. The passenger pigeon was estimated at one time to have been the most common bird in the world, numbering 3 to 5 billion (Ellsworth and McComb 2003). There were once as many passenger pigeons within the approximate historic range of the ABB as there are numbers of birds of all species overwintering in the U.S. today.

Although much of the evidence suggesting the reduction of carrion resources as a primary mechanism of decline is circumstantial, this hypothesis fits the temporal and geographical pattern of the disappearance of ABBs, and is sufficient to explain why ABBs declined while congeneric species did not. ABBs are the largest species of *Nicrophorus* in the New World and require carcasses of 3.5 to 7.0 ounces (99.22 to 198.45 g, Kozol *et al.* 1988) to maximize its fecundity, whereas all other *Nicrophorus* species can breed abundantly on much smaller carcasses, with the smaller species using carcasses of 0.11 to 0.18 ounces (3.12 to 5.10 g, Trumbo 1992). In a fragmented ecosystem, larger species have been shown to be negatively affected before smaller species, a phenomenon which has been well-documented with carrion and dung beetles in South America (Klein 1989).

Wide-ranging animals, like the ABB, are typically among the species most threatened by habitat fragmentation, in part because small areas fail to provide enough prey, but also because these animals are more likely to be killed by humans or their vehicles (Karr 1982, Pimm *et al.* 1988, Mladenoff *et al.* 1994, Noss *et al.* 1996). Large mobile species that roam over large areas daily must attempt to move through the fragmented habitat. Moving relatively long distances among different habitat types increases the ABB's chance of encountering appropriate-sized carcasses, but also increase the potential for encountering natural and unnatural mortality, such as predation, insecticides, insect traps (i.e., bug zappers), and nocturnal light pollution (Mladenoff *et al.* 1994, Noss *et al.* 1996). The probability of individual ABBs being subjected to these types of hazards also increases as areas become more developed (Lomolino and Creighton 1996). A study in southeastern Ontario and Quebec found that several species of small mammals rarely ventured onto road surfaces when the road exceeded 65 feet (19.8 m, Oxley *et al.* 1974). Studies elsewhere report similar findings. These studies reveal potential indirect effects to the ABB by limiting its food and reproductive resources. These findings may explain, in part, why the highest densities of ABBs are in relatively large military installations with little agricultural, commercial or residential development.

Species Size

The ABB is the largest species of *Nicrophorus* in the New World and require carcasses of 3.5 to 7.0 ounces (Kozol *et al.* 1988) to maximize fecundity (productivity), whereas all other *Nicrophorus* species can breed on the more abundant smaller carcasses of 0.11 to 0.18 ounces (Trumbo 1992).

For most guilds, larger species tend to feed on larger prey, occupy a greater diversity of habitats, dominate in interference competition, and maintain larger home ranges, but may suffer from exploitative competition from smaller species (Ashmole 1968, Gittleman 1985, Hespenheide 1971, Rosenzweig 1968, Schoener and Gorman 1968, Werner 1974, Wilson 1975, and Zaret 1980). Because larger prey are less abundant than smaller prey (Peters 1983, Brown and Maurer 1987, Damuth 1991, and Lawton 1990), larger guild members require larger home ranges. In addition, larger carcasses are harder to bury than smaller ones (Creighton *et al.* 2009). While large size alone does not necessarily confer endangerment, within trophic or guilds rarity and extinctions tend to be higher for the larger species (Diamond 1984, Martin and Klein 1984, Vrba 1984, Owen-Smith 1988, and Stevens 1992). At less than 2 grams, the ABB is the largest member of a guild that specialize on rare and unpredictable resources, vertebrate carcasses. In contrast to other guild members the ABB must range over a larger area and a greater diversity of habitats to find suitable carcasses.

Trumbo and Thomas (1998) investigated *Nicrophorus* species composition on several small islands in New England (lacking ABBs) and found that smaller islands were not able to support viable populations of large-bodied *Nicrophorus* species. They suggested that larger species required more carrion resources and were therefore more prone to local extinctions. The extant population of ABBs on Block Island seems to be relatively free of competitive pressures; not only are there unusually large populations of ground-nesting birds, but there are few mammal predators or scavengers and supplemental carrion provisioning is provided annually (Amaral *et al.* 1997). This hypothesis is among those most well supported by the available evidence. However, more studies on response of silphid communities to habitat fragmentation are needed, especially those that will contrast historic and current habitats, or compare multiple extant sites of ABBs.

DDT and Pesticide Use

Hoffman *et al.* (1949) showed, in a controlled study, that DDT spraying eliminated populations of three *Nicrophorus* species (*N. orbicollis*, *N. sayi*, and *N. defodiens*). Kozol (1995) and the USFWS (1991) concluded that given the apparent timing and pattern of decline exhibited by ABBs, particularly in the Northeast, DDT could not have been responsible for most extirpations, since populations were largely gone a full 25 years before organochlorine compounds were broadly applied as pesticides. In addition, some populations persisted following DDT spraying in Oklahoma, Nebraska, and Missouri, while other unsprayed areas within the ABBs historical range no longer support the species. In the Midwest however, several ABB populations disappeared during or right after the general period from 1940 to 1972, when DDT was actively applied as a pesticide. Although, this hypothesis is rejected as the primary explanation, it remains possible that some ABBs may have been extirpated by DDT use.

Intraspecific and Interspecific Competition

Intrasexual competition occurs until usually only one male and female remain. Size appears to be the most important determinant of success in competition for securing carrion; the largest individuals displace smaller *Nicrophorus* (Kozol *et al.* 1988). Even after burial of a carcass

ABBs have been recorded as commandeering a carcass buried by another *Nicrophorus* species. However, factors other than size might affect the outcome of competition (i.e., temperature or activity patterns). Trumbo (1992) showed that the potential for *Nicrophorus* congener competition for carrion increased with carcass size and Scott *et al.* (1987) found the same results with carrion-feeding flies. Congener competition extends from the increase in vertebrate scavenger pressure, exacerbated by habitat fragmentation, and a decrease in carrion of the ideal weight size, due to extinction and population declines, the competition between ABBs and sympatric congeners for sub-optimally sized carcasses will be expected to increase.

The ABBs most similar congener is *N. orbicollis*, based on historical geographic range, presumably the ecological tolerances (diel periodicity, breeding season, etc.), and phylogenetic information indicating these species may be each other's closest surviving relatives (Szalanski *et al.* 2000). Being so similar, they likely are each other's greatest congeneric competitors (Sikes and Raithel 2002). Interspecific competition may affect populations at the local level. Typically, surveys for ABBs result in 10 or more times more *N. orbicollis* than ABBs (Lomolino and Creighton 1996, Amaral *et al.* 1997, Carlton and Rothwein 1998). Kozol (1989) demonstrated that *N. orbicollis* was about eight times more abundant than ABBs on Block Island, Rhode Island while Walker (1957) collected 19 times more *N. orbicollis* (175) than ABBs (9) in the single trapping array where the latter species was encountered in Tennessee. While the ABB is more successful than *N. orbicollis* in utilizing carcasses greater than 100 g, these data suggest that this congeneric species may pose formidable competitors for the ABB (Sikes and Raithel 2002) and may have actually increased (been "released") in those areas where ABBs disappeared (USFWS 1991). In addition, *N. marginatus* may be a formidable competitor to ABBs. *N. marginatus* is on average slightly larger and utilizes larger carcasses than *N. orbicollis* and in Nebraska and South Dakota is typically more abundant (Backlund and Marrone 1997 and Bedick *et al.* 1999). Another, threat to ABB reproductive success is the oviposition by other *Nicrophorus* species near an ABB buried carcass, allowing brood parasitism (Müller *et al.* 1998, Trumbo 1994). Trumbo (1992) found that mixed *Nicrophorus* broods were more common on larger carcasses.

The imported fire ant *Solenopsis invicta* has become a formidable competitor for carrion and a potential source of mortality for *Nicrophorus* beetles when they co-occur at a food source (Warriner 2004, Godwin and Minich 2005). Scott *et al.* (1987) concluded that the inability of *N. carolinus* to successfully bury carrion provided experimentally in Florida was due to interference by imported fire ants. Only 5 of 48 carcasses were successfully exploited by *N. carolinus*, despite pitfall trapping that demonstrated that *N. carolinus* was locally abundant. Collins and Scheffrahn (2005) noted that fire ants may reduce ground-nesting populations of rodents and birds, and in some instances, may completely eliminate ground-nesting species from a given area. Fire ant infestations are not evenly distributed; rather, they tend to be more numerous in open, disturbed habitats (Carlton in litt. 1996). Fire ants now infest all or parts of Alabama, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, and Texas (USDA 2003).

Loss of Genetic Diversity in Isolated Populations

Kozol *et al.* (1994) examined ABB genetic variation within and between the Block Island and the eastern Oklahoma and western Arkansas population. Both populations have low levels of genetic variation, and most of the variation occurs within a single population. There were no unique diagnostic bands within either population, but they found the OK/AR population to be somewhat more diverse. This reduced genetic variation is often a result of founder effect, genetic drift, and inbreeding. They suggest that multiple bottleneck events, small population size, and high levels of inbreeding may be factors contributing to the pattern of diversity in ABBs.

Szalanski *et al.* (2000) expanded on Kozol *et al.*'s study and examined ABBs from five populations: Block Island, Arkansas, South Dakota, Oklahoma, and Nebraska. The authors found little evidence that the five populations have maintained unique genetic variation and no evidence to suggest that these five populations should be treated as separate, genetically independent conservation segments.

Recovery Efforts

A summary report of ABB recovery implementation progress can be viewed at the Service's Environmental Conservation Online System (ECOS) under the Recovery section of the ABBs Species Profile page (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode =I028).

ENVIRONMENTAL BASELINE

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

Status of the Species within the Action Area

The Action Area currently encompasses 34 counties in eastern Oklahoma. This area includes the current 22 ABB counties (Table 2) and the remaining 12 counties (Table 3) that are reasonably likely to have ABBs. The entire 34 county area is approximately 28,623 square miles (over 18 million acres; Woods *et al.* 2005). The 22 confirmed counties represent approximately 40-50 percent of the current known occupied range of the ABB.

The Action Area covers portions of 10 Level III ecoregions including, Central Great Plains, Flint Hills, Cross Timbers, Central Irregular Plains, Ozark Highlands, Boston Mountains, Arkansas Valley, Ouachita Mountains and the South Central Plains (Omernik 1987, Woods *et al.* 2005).

Ecoregion descriptions below were derived from Duck and Fletcher (1943) and Woods *et al.* (2005).

Ozark Highlands (2,380 mi^2)

The Ozark Highlands ecoregion is a level to highly dissected plateau composed of flat-lying, cherty limestone. Mean annual precipitation in this humid region is 41 to 49 inches. The growing season ranges from 200 to 215 days. Soils are very shallow, rocky, well drained, very strongly acid-humus-poor on steep slopes (27%). Oak-hickory forests and limited oak-hickory-pine forests are native on uplands. Today, rugged areas generally are wooded and nearly level sites are used as pastureland or hayland.

Karst features, such as sinkholes and caves, are common in the Springfield Plateau portion of the ecoregion. Historically, uplands of the Springfield Plateau were dominated by oak-hickory forest and savannahs, with fire-maintained tallgrass prairies. Today, much of the forest, and nearly all the prairie, has been replaced by agriculture or expanded residential areas. The Elk River Hills is composed of narrow ridgetops and intervening, steep V-shaped valleys. Carbonate rocks, along with associated karst features, are typical. Natural upland vegetation is oak-hickory and oak-hickory-pine forests and woodlands.

Boston Mountains (838 mi^2)

The Boston Mountains region is a deeply dissected, mountainous plateau composed of sandstone and shale, and mostly covered by a mosaic of forest and woodland types. Mean annual precipitation in this humid ecoregion varies from 44 to 51 inches, and increases eastward. The growing season ranges from 200 to 220 days. Soils are generally medium textured, stony and shallow. Natural vegetation is oak-hickory forest. The ecoregion remains mostly forested. Flatter areas, however, are used as pastureland or hayland.

Arkansas Valley (4,824 mi^2)

The Arkansas Valley separates the Ozark Plateau from the Ouachita Mountains to the south. This ecoregion is characteristically transitional and diverse. Plains, hills, floodplains, terraces, and scattered mountains all occur. The terrain, however, is distinct from either neighboring ecoregions. Annual average precipitation is 44 to 50 inches. The growing season lasts 200 to 240 days. Soils are variable in characteristics, ranging from shallow to deep, but most are well drained. Soil moisture is adequate for plant growth during most of the growing season. A mix of oak savanna, prairie, oak-hickory-pine forest, and oak-hickory forest is native on uplands. Bottomland forest is native on floodplains and low terraces. Much of the floodplain and other areas of deeper, productive soil are used for crops.

The Scattered High Ridges and Mountains portion is covered by savannas, open woodlands, or forests dominated or co-dominated by upland oaks, hickory and shortleaf pine. Loblolly pine also occurs, however, it is not native. The Arkansas River Floodplain is veneered with alluvium and includes natural levees, meander scars, oxbow lakes, point bars, swales, and backswamps. The Arkansas Valley Plains, once covered by a distinctive mosaic of savanna, woodland, forest and prairie, today consists mostly of pastureland or hayland. But its scattered hills and ridges remain wooded. The Lower Canadian Hills acts as a transition between the drier Cross Timbers to the west and moister parts of the Arkansas Valley to the east. Native vegetation is a mixture of oak woodland, tallgrass prairie, oak-hickory forest, and oak-hickory-pine forest.

Ouachita Mountains (4,073 mi^2)

The forested low mountains of this ecoregion are characteristically underlain by folded, sedimentary rocks of Paleozoic age. Mean annual precipitation in this humid ecoregion is 43 to 57 inches. The growing season ranges from 190 to 230 days, with average frost free days being the shortest in protected valleys and in the eastern portion of the ecoregion. On steep slopes (30%), soils are well to moderately well-drained. On moderately steep slopes (8%), soils are moderately well-drained and acid to silty loam. Oak-hickory-pine forest is native on uplands. This ecoregion remains mostly forested, but pastureland and hayland occur in wider valleys.

The Athens Plateau of the Ouachita Mountains is composed of open hills and low ridges that are widely underlain by Mississippian Stanley Shale. In the Central Mountain Ranges shallow, stony soils are common and support oak-hickory-pine forest. Ridges are steep enough to limit logging. This area contains the largest remaining tract of un-logged, old growth oak-pine habitat in the United States. Its pine woodlands are managed to increase the population of the endangered red-cockaded woodpecker. The Fourche Mountains are composed of east to west trending, folded, sandstone-capped ridges and intervening shale valleys. Natural vegetation is oak-hickory-pine forest. Forests on steep, north-facing slopes are more mesic than on southern aspects. Steepest, south-facing slopes with shallow, moisture deficient soils support shrubs and rocky glades. Pastureland and hayland are restricted to broad valleys. The low mountains, hills and valleys of the Western Ouachitas are covered with oak-hickory-pine forest, and largely underlain by sandstone and shale. Natural vegetation of the broad Western Ouachita Valleys is oak-hickory-pine forest on uplands and bottomland forest on floodplains and low terraces. Prairies also occurred prior to the 20th century.

South Central Plains (2,625 mi^2)

The South Central Plains is an irregular, forested plain cut by shallow valleys and underlain by poorly-consolidated deposits. Mean annual precipitation in this humid region varies from 45 to 55 inches, and increases eastward. This region occupies the edge of the southern coniferous forest belt. The growing season averages 215 to 235 days. Soils vary from deep clayey and humus-rich on gentle slopes (7%), very deep loamy and well drained soils on gentle slopes (6%), very deep and strongly acid soils on steep slopes (12%), very deep somewhat poorly drained and strongly acid soils on nearly level slopes (1%), and very deep clayey, moderately well drained, mildly alkaline and humus-rich soils on level areas. Natural vegetation is oak-hickory-pine

forest on uplands and southern floodplain forest on bottomlands. Prairies once occurred on soils derived from limestone, marl, and calcareous shale. Today, uplands are largely pastureland or forest dominated by shortleaf pine, loblolly pine, oaks, and hickories. Poorly-drained floodplains support bottomland forests and wetlands. Cropland is most extensive along the Red River.

The Floodplains and Low Terraces portion of the ecoregion is nearly level, susceptible to flooding, and veneered by alluvium. This portion includes natural levees, swales, terraces, and slowly moving streams in meandering, low gradient channels. Oxbow lakes and forested wetlands are common with distinct flora and fauna. The Pleistocene Fluvial Terraces are nearly level, periodically wet, and characteristically veneered by unconsolidated Pleistocene terrace deposits. The lowest terrace is clayey and supports hardwood wetlands. Higher terraces are dominated by pine flatwoods; however, pastureland and hayland also occur. The level to hilly Cretaceous Dissected Uplands are mostly underlain by calcareous sands, clays, and gravels. Natural vegetation is mostly oak-hickory-pine forest. The nearly flat Red River Bottomlands are veneered with Holocene alluvium and have been widely cleared and drained for agriculture. This ecoregion contains floodplains, low terraces, oxbow lakes, meander scars, backswamps, levees, drainage ditches, and the Red River. Natural vegetation is southern floodplain forest. The level to rolling Blackland Prairie has deep, dark soils derived from underlying limestone, marl, and calcareous shale.

Central Irregular Plains (5,211 mi^2)

The Central Irregular Plains is a belt of prairie that separates the Cross Timbers from the forests of the Boston Mountains and Ozark Highlands. Interbedded Pennsylvanian-age shale, sandstone, limestone, and coal occur. The alternating hard-soft strata dip westward, forming nearly flat to irregular plains, low hills, and east-facing cuestas. Average annual precipitation ranges from 39 to 45 inches in this humid ecoregion and increases southward and eastward. The growing season ranges from 200 to 225 days, increasing southward through the ecoregion. Soils are clayey and loamy on 3 percent slopes, or clayey and silty and humus-rich on 6 percent slopes. Natural vegetation is mostly tall grass prairie, but forests and woodlands - dominated by post oak, blackjack oak, and black hickory - are native on stony hilltops. Today, this region is a mix of native rangeland, introduced grassland, upland woodland, floodplain forest, and farmland. Cropland is most extensive on nearly level plains.

The Osage Cuestas, an irregular to undulating plain, comprises the largest portion of the Central Irregular Plains in Oklahoma. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak-hickory forest is native to eastern areas. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur. The smaller Cherokee Plains is a nearly flat erosional plain that is dominated by clayey, slowly permeable soils. Claypans occur and impede percolation drainage. Natural vegetation is mostly tall grass prairie. Today, the ecoregion is mostly cropland. Rangeland occurs on steeper slopes and riparian areas are wooded.

Flint Hills (797 mi^2)

The Flint Hills includes the western edge of tall grass prairie in Oklahoma. Its grass-covered, open, low hills, cuestas, and plains are underlain by cherty limestone and shale. Mean annual precipitation is 38 to 42 inches and the mean annual frost free days range from195 to 205. The natural vegetation is primarily tall grass prairie, dominated by big bluestem, little bluestem, switchgrass and Indiangrass. On moisture deficient soils, short grasses such as blue grama, side-oats grama and hairy grama, as well as prickly pear, occur. In the narrow riparian areas, bottomland forests containing cottonwood, hackberries, elms and oaks are common.

Cross Timbers (6,910 mi^2)

The Cross Timbers consists of a mix of savanna, woodland, and prairie, and separates the forests of the east from the prairies of the drier west. Climatic conditions in this region are characterized as subhumid, mesothermal with average precipitation ranging from 32 to 42 inches annually. The growing season averages 195 to 225 days. Soils vary from moderately acidic and humus-poor on steep slopes (18%) to shallow, rocky and humus-rich on gentle slopes (5%).

The hills, cuestas, and ridges of the Northern Cross Timbers are naturally covered by a mosaic of oak savanna, scrubby oak forest, eastern red cedar on porous, course-textured soils derived from sandstone, and tall grass prairie on fine-textured soils derived from limestone or shale. Soils are highly erodible when disturbed. The rolling hills, cuestas, and ridges of the Eastern Cross Timbers are naturally covered by oak savanna, scrubby oak forest, eastern red cedar, and tall grass prairie, and are underlain by sand, shale, clay, sandstone, calcareous shale, and limestone. Post oak and blackjack oak are dominant on sandy soils while finer soils support grasses. Tall grass prairie and oak savanna are native to the rolling hills and plains of the Arbuckle Uplift, and developed over a unique mosaic of limestone, granite, dolomite, sandstone, and shale. Upland soils that were derived from limestone are usually shallow, moisture deficient, and erodible if disturbed.

The Cross Timbers Transition consists of rough plains that are covered by prairie grasses and eastern redcedar, scattered oaks, and elms. Terrain and vegetation are transitional between the less rugged, grass-covered regions to the west and the hilly, oak savannas to the east.

East Central Texas Plains (364 mi^2)

The East Central Texas Plains ecoregion is composed of plains with fine-textured soils and claypans. Mean annual precipitation in this moist-subhumid region ranges from 42 to 45 inches. The growing season ranges from 230 to 235 days. The portion of the ecoregion in Oklahoma is characterized by level to rolling plains, extensive clay flats, and slowly to very slowly permeable soils that were derived from Cretaceous-age plastic shale, marl, limestone, sand, and gravel, which are deep clayey and humus-rich on gentle slopes (7%). Tall grass prairie and oak savanna are native. Cropland and pastureland are now common.

Central Great Plains (625 mi^2)

The Central Great Plains, in Oklahoma, are largely underlain by red, Permian-age sedimentary rocks and include scattered hills, breaks, salt plains, low mountains, gypsum karst, sandy flats, and sand dunes. Mean annual rainfall ranges from 29 to 38 inches and increases eastward. The growing season ranges from 205 to 225 days annually. Soils are clayey and silty and humus-rich on gentle slopes (6%), and clayey on very gentle slopes (4%). Mixed grass prairie, cross timbers, and tall grass prairie comprise the natural vegetation. Riparian corridors support hardwood forest. Today, scattered oaks, hickories, and increasingly, eastern redcedar occur on uplands. Only 2 percent of this ecoregion occurs within the Action Area.

Of the 47 land cover types identified by the Oklahoma Gap Analysis Project (Fisher and Gregory 2001), 32 are represented within the Action Area of eastern Oklahoma. These cover classes include, Agriculture, Barren, Central Bottomland Forests, Central Crosstimbers, Warm Season Crops, East Central Bottomland Forests, Eastern Bottomland Forests, Eastern Crosstimbers, Eastern Red Cedar/Oak Woodland, Eastern Red Cedar Woodland, White Oak/Hickory Forests, Loblolly Pine/Oak Forest, Loblolly Pine Forest - Planted/Cultivated, Loblolly Pine Forest, Oak/Cedar Forests, Oak/Hickory/Pine Forests, Oak/Pine Forests, Oak/Pine Woodland, Oak Woodland, Pine/Oak Woodland, Shortleaf Pine/Oak Forest, Shortleaf Pine Forest, Tall Grass Prairie, Tallgrass Cedar Savanna, Tallgrass Oak Savanna, Warm Season Improved/Introduced Pasture, Sandy Areas, Pond, Lake/Reservoir, Riverine, and Residential/Industrial.

Land use and management activities within the Action Area vary greatly and include, grazing by domestic livestock, outdoor recreation, agriculture (e.g., peanuts, soybeans, grain sorghum, small grains, hay, cotton, corn, wheat, pecans), poultry production, oil and gas production, logging and commercial pine plantations, mining, and outdoor recreation (Woods *et al.* 2005).

Within the Action Area, normal total precipitation (1971-2000) ranges from 39 to 57 inches annually and normal annual temperature (1971-2000) ranges from 58°F to 63°F (Oklahoma Climatological Survey 2010a). Long-term climate trends indicate an approximate statewide precipitation pattern of 5 years of above average conditions followed by 5-10 years of below average conditions. A significant exception to this pattern runs from approximately 1983 to current, and the data exhibit an extended period of predominately above average precipitation (Figure 1; Oklahoma Climatological Survey 2010b). Long-term climate trends for temperature are more irregular (Figure 2; Oklahoma Climatological Survey 2010b).

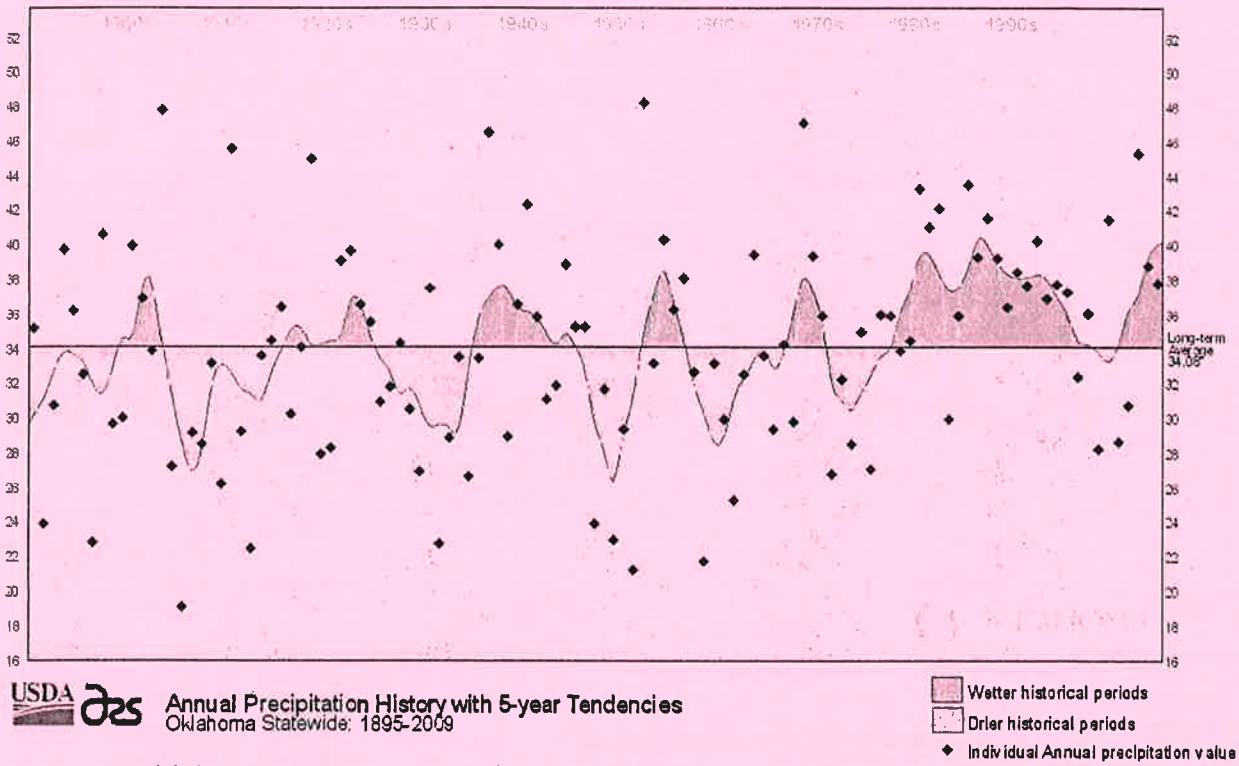

Figure 1. Oklahoma Statewide Annual Precipitation History (1895-2009) with 5-year Tendencies from the Oklahoma Climatological Survey.

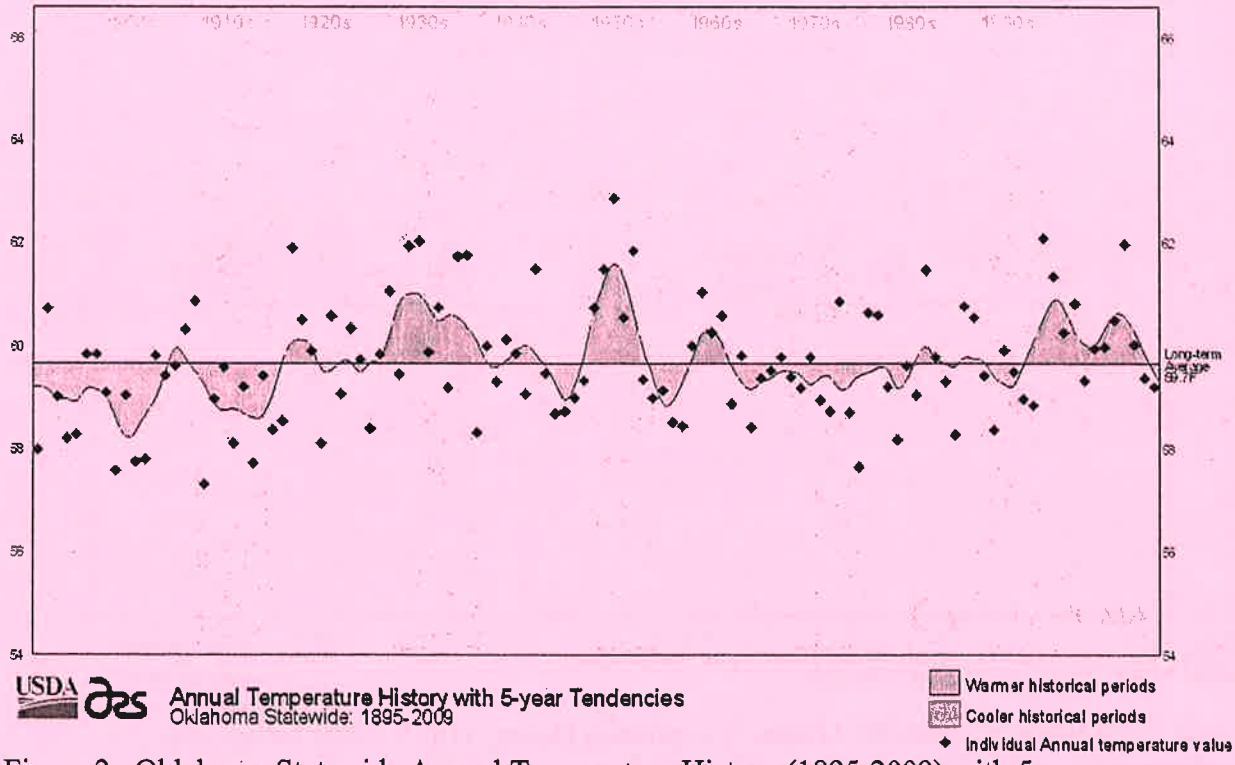

Figure 2. Oklahoma Statewide Annual Temperature History (1895-2009) with 5-year Tendencies from the Oklahoma Climatological Survey.

Factors Affecting Species Environment within the Action Area

To adequately evaluate the effects of WH-LTHF activities throughout eastern Oklahoma on the ABB covered in this PBO, the Service must consider the individual and cumulative impacts from these activities. Additionally, the Service must also consider other, separate effects currently ongoing and likely to occur in the foreseeable future that also could have adverse impacts to the ABB within the Action Area.

Other Consultations

During fiscal years 2006, 2007, 2008, and 2009 (October 1 to September 30) the Service consulted on approximately 203, 215, 306, and 171 proposed actions, respectively, potentially affecting the ABB in Oklahoma. Project types evaluated included pipelines, roads, quarries, communication towers, residential housing development, bridges, mining, petroleum production, commercial development, recreational development, transmission lines, and water and waste water treatment facilities. Impacts from these activities varied in size and duration, with projects such as quarries being hundreds of acres and having permanent impacts, to water treatment facilities of a few acres with both permanent and temporary impacts.

There are currently four biological opinions with incidental take statements issued and still in effect. One biological opinion authorizes the take of 76 acres within the ABB's range in Osage County for the construction of a botanical preserve. The second biological opinion authorizes take of 35 ABBs per year throughout the Camp Gruber National Guard Installation. The third is a programmatic biological opinion for the Federal Highway Administration within the ABB's range in Oklahoma authorizing take of 5,998.98 acres of ABB habitat. The fourth biological opinion is with the Ouachita National Forest authorizing take of 34,954 acres of ABB habitat within Oklahoma and Arkansas.

Permits

Currently, 25 entities or individuals possess section 10 permits for the ABB in Oklahoma. Eighteen are section 10(a)(1)(A) scientific research permits to enhance the survival of the species and one is an incidental take permit issued in conjunction with a Habitat Conservation Plan (HCP). Although 25 permits are enhancement of survival permits, some authorized take of ABBs can occur. The permitted research must further conservation efforts for the species, but the loss of some individual ABBs over the short-term from research is allowed as long as the survival of the ABB is not jeopardized. The Service requires that every available precaution be implemented to reduce and/or eliminate authorized take associated with research activities.

In addition, the Service may recommend that ABBs be trapped and relocated in certain instances. While these activities can have adverse impacts, the existing recovery permit allows for take which may occur. The extent of take is usually unknown prior to implementation of this type of activity. However, all accidental deaths are required to be reported to the Service. Between 1997 to 2008 annual ABB incidental deaths in Oklahoma ranged from approximately 5 to 29 individuals.

The Weyerhaeuser HCP is valid for 35 years and does not estimate a number of ABBs that could potentially be taken. The HCP stipulates the following as foreseeable activities implemented by Weyerhaeuser over 35 years: 28,000 acres (average of 800 acres per year) of forest will potentially be harvested; 16 ponds constructed; 10 or fewer food plots planted; EPA approved application of pesticides for control of pales weevil damage to planted pine seedlings; ROW vegetation control; 2 miles of road constructed; 20 acres of mineral, oil, or gas exploration; and no more than 600 acres of cattle grazing. From 1997 to 2000 about 10,710 acres of Weyerhaeuser lands were surveyed for the ABB annually and from 2001 to 2003 about 14,382 acres were surveyed. Take in the form of acres has not been exceeded to our knowledge. From 1997 to 2003 the following numbers of ABBs were captured: 106, 64, 26, 41, 16, 25, and 85, respectively.

Other ABB Conservation Efforts Ongoing Within the Action Area

Northeastern State University and Camp Gruber are cooperating on an ABB Reproductive Microhabitat Study at Camp Gruber. The 2008 field season will be the third year of the project. Currently, no conclusive results have been documented due to low sample size. However, the 2008 study design has recently been modified to increase the sample size.

EFFECTS OF THE ACTION

The BLM's WH-LTHF program will be administered opportunistically throughout the ABB's entire range in Oklahoma, based on qualifying responses to future RFPs, contract rebids and contract modifications. The Service believes it is a contradiction of the intent of The Wild Free-Roaming Horse and Burro Act of 1971 to remove excess animals from western public rangelands "...to achieve and maintain a thriving natural ecological balance on the public lands" while placing them on non-federal lands without at least equal consideration of the ecological impacts.

A thorough evaluation of the components and processes within grazed systems requires a multi-disciplinary effort to integrate required information. The nutritional requirements of grazing animals and foraging behavior employed to acquire energy and nutrients must be understood to accurately evaluate animal production. Insight into the effects of grazing on individual plant growth and function, plant population dynamics, and structure and function of communities and ecosystems, as well as hydrological and climatic considerations, is necessary to evaluate the influence of grazing on system integrity and sustainable production. Finally, an understanding of the integrated effect of these processes on livestock and wildlife production and economic considerations is essential for the development of ecologically sound management strategies within a complex decision environment (Heittschmiditt and Stuth 1991).

Grazing is a compatible land use of rangelands when conducted at appropriate levels as dictated by the site productivity, local climate trends, historic land use, and the type and class of animals used. Varying levels of grazing intensity will have different impacts on rangeland wildlife. Grazing is a fully compatible land use of rangelands and can be a vital management tool used to

promote wildlife conservation. The Service supports grazing when managed appropriately using the best available peer-reviewed scientific information. However, wild horses are behaviorally, morphologically and physiologically different from cattle and other artiodactyls and have a resulting unique effect on the structure, composition, function and vegetation patterns of rangeland ecosystems (Beever 2003).

Stocking rate decisions are difficult to make in a timely manner because the optimal grazing intensity at any given time is dependent upon the occurrence of future climatic conditions. Climatic variation determines that the optimal grazing intensity to maximize livestock production is variable in both time and space (Heittschmiditt and Stuth 1991). As a result, the optimal stocking rates for livestock production in extensive rangeland settings vary widely among seasons, years, and sites, and within and among geographical regions (Morley 1966, McCown 1982).

Large mammalian herbivores exert numerous influences on landscapes they inhabit, including trampling and disturbance of soils, altering nutrient distribution, selective consumption of plant material, and trampling of vegetation (Archer and Smeins 1991, Augustine and McNaughton 1998). The effects that large herbivores impose upon a given ecosystem will depend upon many factors, including the plant-animal coevolutionary history, soil development, climate, recent weather, frequency and seasonality of the grazing, effects of other sympatric species, and often most importantly, animal density (Milchunas *et al.* 1988).

For the ABB, one important indirect effect of grazing on ecosystems may be that imposed on small-mammal communities. Mammals perform a variety of ecological functions, including seed dispersal, seed predation, and herbivory, as well as soil perturbation and aeration (Brown and Harney 1993). Changes in mammal communities would likely indirectly affect the plant community. Data compiled using grazing exclosures in Nevada document significant negative impacts from wild free-roaming horses to plant species richness, total percent cover, abundance of grasses and shrubs, as well as decreased number of small mammal burrow entrances (Beever and Brussard 2000).

On most arid and semiarid rangelands, about 55 percent to 70 percent remaining climax vegetation (good range condition) will maximize plant diversity and livestock nutritional status (Holecheck *et al.* 1998). Effects of grazing are magnified during drier years (Beever and Brussard 2004, Jardine and Forsling 1922, Detling 1998).

Frequent low intensity and widespread fire, drought, and grazing by native herbivores were the principle historic and natural sources of disturbance within much of the historic range of the ABB (McNab and Avers 1996). Fires removed most of the brush and young woody growth in forested areas, while retarding succession to woody vegetation in grasslands (The Nature Conservancy 2000, 2003a and 2003b). Fires also return nutrients to the soil and stimulate the growth of grasses and forbs in prairie areas (The Nature Conservancy 2000). Other climatic influences within eastern Oklahoma included winter ice storms and spring tornadoes (McNab and Avers 1996).

Beneficial Effects

The BLM proposes to facilitate long-term conservation for the ABB through contribution of funds for ABB conservation efforts to The Oklahoma Chapter of The Nature Conservancy. Specifically BLM commits to providing up to $200,000 at a rate of $1/acre as each acre of WH-LTHF (in ABB habitat in Oklahoma) comes under the PBO (new contracts, contract rebids and contract modifications/expansions). This conservation approach allows BLM to address their impacts on ABB habitat, including the loss, modification and fragmentation of habitat.

Direct Effects

Direct adverse impacts to ABBs can occur from ground disturbance associated with the proposed action. Construction activities related to modified or expanded fences and/or corrals and handling facilities would disturb soils and have the potential to harm individuals. Direct adverse impacts to ABBs during their inactive and active periods may occur as a result of impacts from clearing vegetation, heavy equipment operation, fuel and chemical contamination of the soil, grading rough terrain and soil excavation and filling. Uncovered ABBs could be exposed to predation, adverse environmental conditions or being crushed by equipment. If construction occurs during the active season, ABB broods could be displaced during soil excavation, adults could be separated from larvae/eggs and/or crushed by equipment.

Use of heavy construction equipment, such as bulldozers, excavators, track hoes, back hoes and/or semi-trucks could compact soils. This could result in destruction of ABB brood chambers, including adults and larvae, and cause soils to be unusable by ABBs for carcass burial during the reproductive season. If construction takes place during the winter season, adult individuals could be crushed and/or ABB re-emergence in late spring or early summer could be prohibited. The accidental spilling of petroleum products and chemicals could contaminate the soil, creating unsuitable habitat and directly killing individuals and/or broods, or displacing individuals to less suitable areas.

Indirect Effects

Indirect effects are those project related effects which are reasonably certain to occur, but later in time. The ABB can be indirectly affected by limitation or reduction in necessary resources, such as carrion; harassment during breeding, brood rearing or overwintering; or the loss, fragmentation, and alteration of suitable habitat.

Impacts are expected to affect individuals and potential breeding pairs of ABB via harm through significant modification of prey species habitat, resulting in decreased ABB feeding, survival and fecundity. Impacts are expected to most likely occur during times of significant drought and a concurrent decision to maintain the pre-drought stocking rate of wild horses on the WH-LTHF. The duration of impacts to the ABB will vary with the severity and duration of grazing during drought conditions, potentially ranging from short-term to long-term. As long as the WH-LTHF contracts are maintained and wild horse stocking rates are not actively managed during droughts (i.e., no significant reduction in stocking rate concurrent with a decline in available forage,

except through minimally beneficial supplemental feeding and a commitment not to ship replacement horses during drought conditions), the potential exists for significant localized impacts to ABB. The frequency and severity of this type of take will be determined by the specific WH-LTHF stocking rate and the onset and duration of drought conditions reducing prey species habitat suitability and populations. While it is impossible to state with certainty due to the unpredictable nature of weather, it is expected that all WH-LTHFs will result in some level of ABB habitat degradation, fragmentation, and/or loss at some point during their contract life due to BLM's limited ability to influence WH-LTHF management actions.

Recovery Units

Recovery criteria in the recovery plan (USFWS 1991) state that the extant eastern and western populations are sufficiently protected and maintained, and when at least two additional self-sustaining populations of 500 or more beetles are established, one in the eastern and one in the western part of the historical range. The interim objective for reclassification will be considered when (a) 3 populations have been established (or discovered) within each of 4 geographical areas (Northeast, Southeast, Midwest, and the Great Lake states), (b) each population contains 500+ adults, (c) each population is self-sustaining for 5 consecutive years, and, ideally, each primary population contains several satellite populations.

Even with the discovery of additional ABB populations, the species remains extirpated from about 90 percent of its historic range, and there is a significant disparity in distribution between the eastern and western populations. Population trend information is available for only a small number of sentinel populations that have been monitored annually for at least the past 10 years. The biological and ecological factors that are sustaining ABB populations in different locations within the species' range and the threats to those factors remain poorly understood for most occurrences. As such, the recent 5-year review recommended the classification of endangered be retained for the ABB. However, due to the indirect and expected temporary nature of the majority of the effects to the ABB, it is not foreseeable that the BLM WH-LTHF proposed action would reduce appreciably the likelihood of survival and recovery of the ABB.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future, non-federal state, tribal, local government, and private actions that are reasonably certain to occur in the Action Area considered in this PBO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In addition to those projects with a federal nexus that undergo consultation, there are numerous actions that do not require federal funding, permitting, or authorization and consequently do not require consultation with the Service. The Service assumes that if there are roughly 200 projects annually with a federal nexus for which we consult; there are at least this many or more nonfederal nexus projects that are implemented in the Action Area.

There are over 400 new oil and gas wells constructed annually, on average, in eastern Oklahoma, with the majority not having a federal nexus. Additionally, numerous oil and gas seismic surveys and pipelines are constructed throughout the project area. There are multiple new or expanding surface coal mines in southeastern Oklahoma. Commercial development is expanding to undeveloped lands on the periphery or in suburbs of cities. Residential developments are being constructed outside city limits or in previously undeveloped or rural areas. The development of renewable energy production projects, such as wind energy, are now being actively pursued for development in portions of the ABB range in eastern Oklahoma. The specific numbers of these type of projects or associated acres of disturbance is difficult, if not impossible, to project or quantify. However, it is clear that there are numerous, continuing and expanding impacts to ABBs and their habitat from nonfederal nexus projects.

CONCLUSION

After reviewing the current status of the ABB, the environmental baseline for the Action Area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the ABB. No critical habitat has been designated, as defined in the ESA, for this species; therefore, none will be affected.

While the ABB has disappeared from approximately 90 percent of its historic range, there are self-sustaining populations in Oklahoma, Arkansas, Nebraska, Kansas, South Dakota, and Massachusetts. Further, there are multiple secure conservation areas (e.g., Camp Gruber, TNC lands, and National Forests) where the ABB is known to occur in Oklahoma and the conservation goals and/or ownerships of these areas are not likely to change. The proposed actions impact roughly 0.01 percent of the total area of eastern Oklahoma and the impacts are expected to be relatively small and localized. Furthermore, some of the anticipated impacts would be temporary in duration. In addition, the contribution to funds towards ABB conservation with TNC will provide long-term net conservation benefits to the ABB.

The Service finds that the proposed action is not likely to jeopardize the ABB for the following reasons:

1. While the Action Area of the PBO covers a significant portion of the entire known range of the ABB, the actual area of impact under the PBO is capped at 200,000 acres. Any expansion beyond this threshold would result in reinitiation of consultation and an evaluation of the effectiveness of the former actions.

2. A cumulative sum of effects from all WH-LTHF operations in Oklahoma are expected to occur on a small amount of the total potential ABB habitat, in Oklahoma and rangewide.

3. Potential WH-LTHF rangeland sites within eastern Oklahoma (i.e., Action Area) are typically comprised of productive soils, relatively higher precipitation amounts, high percentage of annual herbaceous growth (as a part of the total vegetation cover) and

exhibit adaptation to periodic ecological disturbances (e.g., grazing and fire). As such, ABB habitat on rangelands within the Action Area are resilient to short-term negative effects. These systems have the ability to recover from degradation events within months or years, depending on the severity and duration of the negative effects. The effects of the proposed action are not expected to be permanent and are unlikely to jeopardize the continued existence of the ABB.

4. The BLM has incorporated appropriate conservation measures to minimize the duration and extent of effects from the operation of WH-LTHFs. Additionally, to date, BLM has begun proactively providing funds to TNC for ABB conservation efforts in proximity to existing WH-LTHFs.

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCINDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit 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 by the Service 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 by the Service 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 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 ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Measures described below are non-discretionary, and must be undertaken by the BLM. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement terms and conditions or (2) fails to require adherence to terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of 7(o)(2) may lapse. In order to monitor impact of incidental take, the BLM must report progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Take of the ABB is anticipated, both directly and indirectly, from implementation of the proposed projects. The precise number of ABB which could be taken is difficult to quantify because population levels fluctuate annually, climatic factors affecting take are impossible to project and the actual extent to which ABB habitat would be altered is unknown. Consequently, the Service cannot provide a precise measure of the number of ABBs that would be taken. Additionally, the actual take would be difficult to detect for the following reasons: 1) the ABB has a small body size making finding a dead or impaired individual unlikely; and 2) the ABB spends a substantial portion of their lifespan underground. However, the Service believes the amount of habitat altered during project implementation serves as a suitable surrogate for estimating the level of take.

Based upon design of the proposed action and conservation measures by BLM, detailed in the PBA and a review of publicly available information and scientific literature, it is anticipated that during the life of a given WH-LTHF, contractually limited operational limitations would result in the temporary take of a facilities habitat. Thus, the Service anticipates incidental take may occur on a temporary basis on a maximum of 200,000 acres of the Action Area in the form of harm and/or harass over the next 10 years.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

Pursuant to section 7(b)(4) of the Act, the following reasonable and prudent measure(s) (RPM) are necessary and appropriate to minimize the amount of incidental take of ABB:

1. The BLM shall avoid or minimize potential adverse affects to ABB from WH-LTHF operation and management, including habitat degradation, fragmentation and loss.

2. The BLM shall monitor and report implementation of conservation measures

TERMS AND CONDITIONS

In order to be exempt from the prohibition of section 9 of the ESA, the agency must comply with the following terms and conditions, which implement reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary and also must be a condition of any federal permits, contracts or grants issued.

Terms and Conditions for RPM1

1. Areas of soil surface disturbance due to WH-LTHF maintenance and improvements are to be restored and revegetated immediately. Top soil should be set aside and redistributed across newly restored sites to maintain soil integrity.

2. As appropriate, fully implement a supplemental feeding program. The supplemental feeding program will help to minimize and avoid some of the impacts to ABBs by reducing the range forage requirement, lowering the utilization rate and resulting in a decrease in the grazing pressure on the residual forage grasses during the winter months.

3. BLM will not ship replacement or expansion horses during periods of severe drought. Drought conditions will be assessed on a case-by-case basis using the best methods and data available.

4. The BLM will work with the facility operators to minimize the size of new surface disturbing activities in order to keep such activity below the 1.2 acre threshold which triggers the need for ABB field efforts (presence/absence trapping, baiting away and/or trapping and relocation).

Terms and Conditions for RPM2

1. Contribution of BLM funds for ABB conservation efforts, specifically BLM commits to providing up to $200,000 at a rate of $1/acre as each acre of WH-LTHF (in ABB habitat in Oklahoma) comes under the PBO (new contracts, contract rebids and contract modifications/expansions). The corresponding acreage threshold will be 200,000 acres; which, if reached, would trigger reinitiation of ESA section 7 consultation. The dollar amounts are to be provided on a fiscal year (FY) basis as per the following estimated schedule:

    a. The BLM funds would be provided in increments not to exceed $40,000 in any one FY. For the first 2 years of the agreement (FY 2008 & 2009), the BLM would contribute the maximum $40,000 per FY amount. The third year contribution (FY 2010) will include funds corresponding to the balance of any remaining acreage under contract from the FY 2008 and/or 2009 years (i.e., in excess of 80,000 acres) and any new acres coming under the PBO during FY 2010 not to exceed the $40,000 maximum-yearly amount. Contributions each year thereafter would correspond to any acres added during that particular year via new contracts, rebids, etc., occurring during that year.

    b. The BLM agrees to transfer the aforementioned funds to The Oklahoma Chapter of The Nature Conservancy for purposes of ABB conservation in the tallgrass-

prairie habitats of Oklahoma. The BLM and the FWS will cooperatively research possible means of monetary transfer and develop the necessary documents.

2. Written annual reports of previous year's activities shall be submitted by October 1 of each year (until consultation is reinitiated) to the Oklahoma Ecological Services Field Office. These reports must include:

    c. WH-LTHF acres, in total and per facility, in Oklahoma, at the time of the report.

    d. Number of wild horses on WH-LTHF, in total and per facility, in Oklahoma, at the time of the report.

    e. Report of conservation measures and/or recommendations implemented during the time since the last report, including (but not limited to) amount of funds transferred to TNC, surveys completed, or bait away and/or trap and relocation efforts.

    f. The number of acres remaining before reinitiation of consultation, as required by this PBO.

    g. The estimated number of acres affected by drought during the reporting period.

3. The Service must be provided with documentation (i.e., copy of letter to TNC) of contribution of funds to ABB conservation. In addition, the Service must receive confirmation from TNC that said funds have been provided.

The Service believes that no more than 200,000 acres of ABB habitat will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purpose of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary 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 needed to conserve the species.

1. We recommend BLM pursue opportunities to conduct research on the ABB coordinated with the Service.

2. Climate Change. The Great Plains is characterized by strong seasonal variations in climate, including recurring periods of extended drought and alternating with wetter conditions. Drought is considered a universal ecological driver across the Great Plains (Knopf 1996). As described in the recent publication by the U.S. Global Change Research Program, the current projected regional climate changes in the Southern Great Plains, including the WH-LTHF action area, near the end of the century, include increases in summer temperatures (+6°F, lower emissions scenario, +10°F higher emissions scenario) and spring precipitation rates steady to decreasing (0 percent under lower emission scenarios, -5 percent under higher emission scenarios) (Karl *et al.* 2009).

   Annually evaluate effectiveness of existing conservation measures as related to the ABB and the most current information addressing the influence of climate change. Determine if modifications to this programmatic biological opinion are warranted and reinitiate consultation as indicated by the best available information.

3. For new WH-LTHF contracts, pursue opportunities to implement contractual obligations that will further avoid and minimize any potential adverse impacts to the ABB and habitat.

4. Reinitiate WH-LTHF vegetation monitoring and provide annual reports to the Service.

5. Incorporate the required elements and processes of the Executive Order 13186 (Responsibility of Federal Agencies to Protect Migratory Birds) and BLM's Migratory Bird Treaty Act – Interim Management Guidelines [December 18, 2007; In Reply Refer To: 6500 (230) P]. Practices targeted for migratory bird management and conservation will benefit ABBs.

6. Initiate externally conducted research to determine the ecological implications of wild horse stocking and management on rangelands in Oklahoma.

7. Certify all horses weed free prior to bringing in to the state. This would require being held at a holding facility, groomed, fed certified weed-free hay and allowed to process before entering state. Transporting herbivores over large distances can facilitate the movement and establishment of exotic and invasive plant species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests written notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or 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 listed species or critical habitat not considered by in this opinion, or (4) a new species is listed or critical habitat is 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.