United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
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In Reply
Refer To:
02ETAR00-2015-F-0527

September 22, 2015

Colonel William M. Myer
Chief, Environmental Programs Division
National Guard Bureau
ATTN: Mr. Brian Knapp
Texas Military Department, Bldg. 1
2200 West 35th Street (NGTX-FE)
Austin, Texas 78703

Dear Colonel Myer:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the Texas Army National Guard (TXARNG) proposed military training activities and the implementation of the Camp Maxey Integrated Natural Resources Management Plan, revised 2010 (INRMP) involving land and natural resources management at Camp Maxey and their potential effects on the federally listed American burying beetle (*Nicrophorus americanus*)(ABB).

This BO has been prepared in accordance with section 7 of the Endangered Species Act (ESA) of 1973, (16 U.S.C. 1531 et seq.) as amended. The BO covers activities at Camp Maxey over the next five years, and is based on the Biological Evaluation included with your May 7, 2015 letter reinitiating consultation, the INRMP, information provided by TXARNG staff, and other sources of information. A complete administrative record of this consultation is on file at the Service's Arlington, Texas, Ecological Services Field Office.

Consultation History

January 28, 2008 - Arlington Field Office issues a Biological Opinion regarding the endangered ABB at Camp Maxey, Lamar County, Texas (Service Consultation # 21420-2006-F-0437).

December 2014 - Discussions with Brian Knapp of TXARNG on potential changes to the existing BO based on current status of the ABB at Camp Maxey.

May 15, 2015 - Arlington Field Office received request to reinitiate formal consultation for the ABB on Camp Maxey due to new information about the ABB population and the incidental take statement in the 2008 Biological Opinion.

July 16, 2015 – Arlington Field Office staff visited Camp Maxey to tour the area. Specific sites were observed and potential impacts were discussed with TXARNG staff.

July 22, 2015 – Received additional baseline information from Brian Knapp, TXARNG. Environmental Baseline removed structure, roads and water bodies from Camp Maxey area.

August 17, 2015 – Draft BO sent to TXARNG.

September 1, 2015 – Comments received from TXARNG on draft BO.

BIOLOGICAL OPINION

Background and Approach

The first BO for Camp Maxey was issued to the TXARNG on January 28, 2008. At that time, it was established that a substantial population of ABB occurred at the Camp and may be adversely affected by military training and general management of the facility. Since the issuance of the BO, annual surveys for the ABB have been conducted; however, the presence of the ABB has not been detected since 2008. It is suspected that long term drought and warm climate conditions have led to the decline and possible extirpation of the ABB at Camp Maxey, and perhaps north Texas. As of the date of issuance of this BO, Camp Maxey may not be occupied by the species. However, due to the nature of an annual species such as the ABB, population and distribution fluctuations are common and driven by a variety of environmental factors. It is reasonably certain that the ABB will return to Camp Maxey because of an abundance of suitable habitat and favorable environmental conditions.

In order to address the current situation, the TXARNG requested reinitiation of section 7 consultation to allow for greater flexibility in training and land management actions than agreed upon in the previous BO. The Service agrees that an updated BO is warranted, but recognizes the need for a different approach due to the potential for the ABB to return to Camp Maxey during the life of the project. The approach developed in this BO uses an adaptive management framework intended to accommodate the TXARNG needs, while implementing provisions to minimize impacts to the ABB should it re-establish at the Camp. As was done previously, this BO fully analyzes the potential effects to the ABB from the proposed activities based on a transient population occurring on the Camp. The Incidental Take Statement utilizes habitat area as a surrogate for the species, and estimates incidental take based upon actions that would result during the times when suitable habitat acres become occupied. Through the adaptive management framework, monitoring and surveys will be implemented to determine the variable status of the ABB within the action area each year. The reasonable and prudent measures and terms and conditions of the Incidental Take Statement are divided into two tiers, based on the adaptive management section of this BO. The first tier recognizes TXARNG's commitment to the monitoring and feedback steps of adaptive management, should monitoring determine the ABB is occupying Camp Maxey; the second tier would be implemented to minimize loss of individuals.

I. Description of Proposed Action

Camp Maxey is a 6,629-acre Texas Army National Guard Training Site located in Lamar County in northeast Texas, approximately seven miles north of Paris and slightly west of the Town of Powderly (Figure 1). Camp Maxey is state owned by the Adjutant General's Department for primary use by the TXARNG. Approximately 657 acres consist of improved grounds associated with buildings, range complex, roads, perimeter fence and cleared area, fire breaks, dig site,

ammunition supply point, open water, and village mock-up training site. Current improvements consist of billets for over 400 people, one dining facility, one administration building, an armory, a classroom and warehouse building, six training areas, seven ranges, one vehicle wash rack, one nuclear biological chemical chamber, five land courses (two land navigation, one confidence course, one common task training, and one mobile operations in urban terrain), one state maintenance shop and one unit training equipment site facility. Bivouac sites occur in various locations throughout Camp Maxey. The remaining 5,972 acres consist of primarily unimproved grounds.

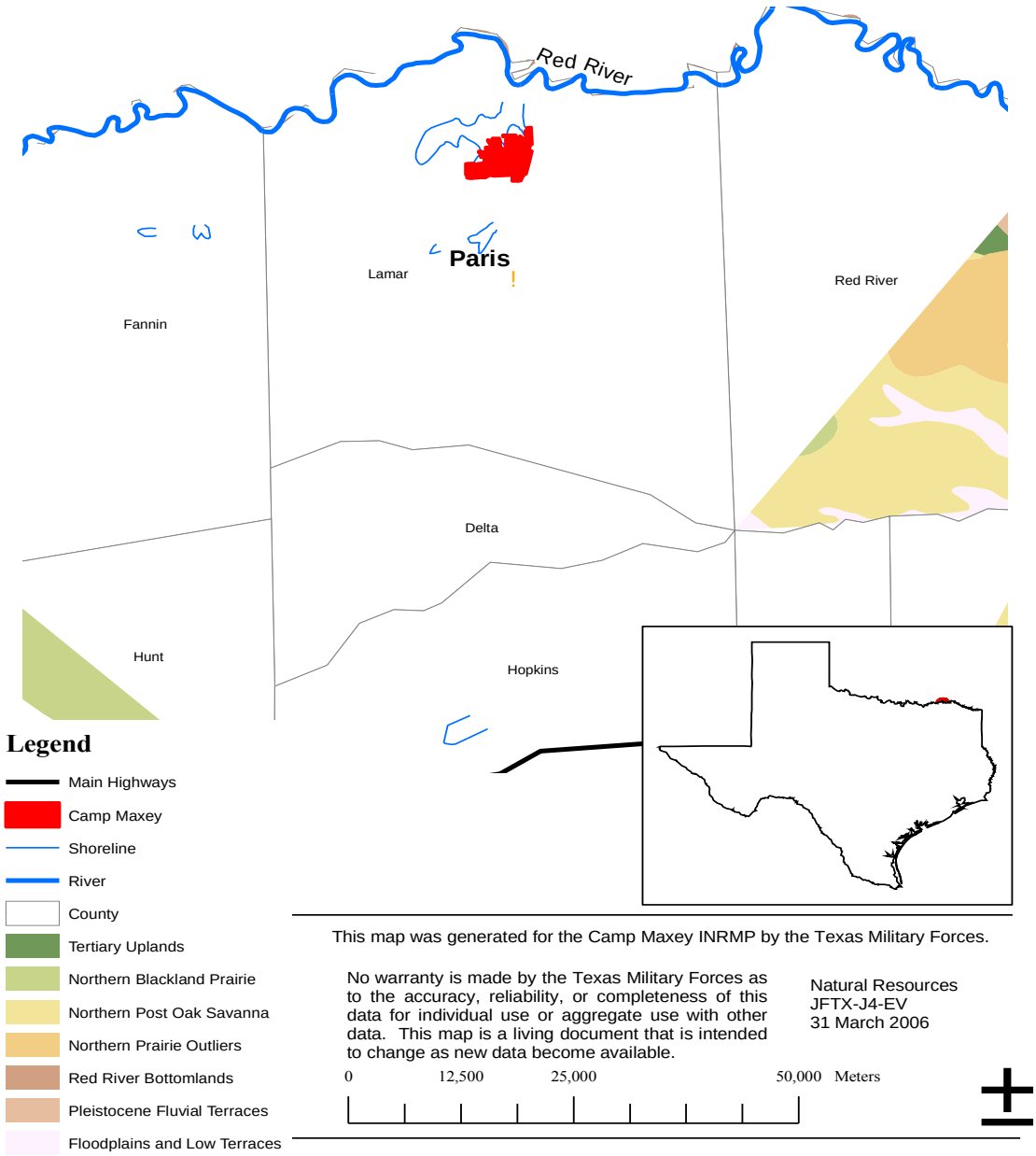

Figure 1. Camp Maxey and adjacent Ecoregions

The approximately 5,972 acres of unimproved grounds are available for light and heavy maneuver training, as well as basic infantry skills, land navigation courses, weapons qualification, combat engineering skills, helicopter operations, wheeled vehicle training, military police training, qualification and proficiency on small arms not exceeding 5.56 mm, and other training for combat readiness for platoons and companies. TXARNG training at Camp Maxey is

primarily infantry training (dismounted maneuver training), which typically involves the use of firing ranges, classrooms, and billets. Away from the ranges and cantonment area, training is largely accomplished on existing roads, land courses and bivouac areas. Off-road activities are principally (>90% of the time) on foot. TXARNG training for each unit occurs primarily one weekend/month and two weeks/year. Across all units this translates to training approximately two weekends/month on average and four continuous weeks/year.

Camp Maxey plays an integral role in the training of Texas Military Forces soldiers as a Maneuver Center of Excellence. The mission of Camp Maxey is to provide World Class quality personnel, facilities, ranges and maneuver areas to support unit individual and collective training objectives with minimal training distractions. The mission requires that the training centers maintain buildings, ranges and maneuver areas to a high state of readiness in support of all training activities. While training and military use of the facility is not the focus of the INRMP, TXARNG has requested an analysis of potential training impacts on the ABB be included in the formal consultation process.

The primary activities resulting from the INRMP and associated land management that may affect the ABB are prescribed fire, pesticide use, red imported fire ant (RIFA) control, invasive plant control, habitat improvement projects, temporary soil disturbance, permanent soil disturbance associated with infrastructure improvements (i.e. fire breaks, road improvements, new ranges, etc.) and feral hog management.

In any given year, no more than one-third of Camp Maxey would be burned using prescribed fire. The amount burned in the summer versus the winter varies, but typically more acreage is burned in the summer than the winter in an attempt to control smooth sumac (*Rhus glabra*) and other invading exotic shrubs. Conducting growing season burns in conjunction with other methods is necessary to control these invading shrubs and ensure Camp Maxey can burn the required acreage each year. Individual winter fires are also likely to be smaller in size than summer fires. There are very rare circumstances in which a new firebreak would be created. Although Camp Maxey has no control over the occurrence of wildfires started off site, there is usually some acreage burned in wildfires every year. Camp Maxey takes into consideration wildfire activity when planning prescribed fires and often reduces the amount of prescribed fire based on wildfire activity.

Several situations associated with troop safety and welfare, invasive species, and habitat management require increased use of pesticides. RIFA and various wasp species are common on ranges and in buildings. Insecticide use outside of built-up areas is unusual and limited to ranges for RIFA control in the form of bait. In addition, Camp Maxey intends to begin managing for some other rare species and sensitive areas that would likely involve RIFA control. In this case, bait would also be used near or in areas of concern. These applications are infrequent and localized. Bait is not left out for extended periods because Camp Maxey is concerned about incidental impact to rare native ants also accessing the bait in addition to potential effects to the ABB. RIFA control is primarily through the form of biological controls and bait applied to ant mounds, usually in spring or fall. Herbicides are used for some invasive plant control outside cantonment areas.

Camp Maxey anticipates new infrastructure projects to support training and INRMP implementation. The TXARNG uses a processes for evaluating construction activities (activities that disturb ground, vegetation, or water) and training activities which allow the Environmental Branch to identify problems early and minimize impacts. TXARNG is developing new infrastructure in support of the training mission, primarily located in existing maintained areas.

When located outside those areas, preference is given to areas with a history of agricultural or military disturbance. The new infrastructure would consist of projects such as ammunition storage bunkers, designating areas for a specific training purpose (with the intent of reducing environmental impact), fuel point pull outs on roads, expansions of existing ranges, urban assault courses and similar projects. Camp Maxey anticipates new infrastructure projects to occur on no more than 250 acres over the next 5 years.

Camp Maxey conducts an average of two erosion repair projects per year outside the cantonment area that result in temporary soil disturbance. These projects are typically less than two acres and are restored to native plant species and stable soils. There are also range upgrade projects involving the replacement of current targets and firing points with upgraded equipment, not creating or extending existing ranges. This can result in temporary soil disturbance, which is then recovered to either Bermuda grass or native grass depending on initial conditions.

The Sikes Act (16 USC 670a-670o, 74 Stat. 1052), as amended, Public Law 86-797, approved September 15, 1960, provides for cooperation between the Departments of the Interior and Defense and State agencies in planning, development and maintenance of fish and wildlife resources on military installations throughout the United States. In order to meet statutory requirements under the Sikes Act, Camp Maxey maintains an active INRMP which is reviewed every 5 years. The INRMP helps Camp Maxey comply with other Federal and state laws, most notably laws associated with environmental documentation such as the National Environmental Policy Act and the ESA. The current INRMP period began in 2010 and will continue until a 5-year review determines a need for revision. This BO will cover a 5-year period from date of signature and aid in updating the existing INRMP to ensure that Camp Maxey meets statutory requirements under both the Sikes Act and ESA, and to implement proactive management programs at the installation.

Adaptive Management

Adaptive management is an iterative process that can enhance understanding and management over time (Williams et al. 2007). Through this process, Camp Maxey will continue to monitor for the presence of ABB, while implementing the project as described. The ABB has not been detected by annual surveys at Camp Maxey since 2008. However, due to its cyclical life history, it is likely to re-establish at Camp Maxey during the life of this BO. Under these circumstances, an adaptive management approach will be used to address the proposed actions and potential impacts to the ABB. This BO includes the evaluation of all potential effects that would result from the proposed action under the circumstances of ABB presence at Camp Maxey. However, the Incidental Take Statement clearly indicates that take is only anticipated should ABB be documented at Camp Maxey in a survey year. As such, the amount of take estimated, in habitat area, is predicated on an ABB population at Camp Maxey during the life of the BO. In the absence of any ABBs, the adaptive management approach will document changes in the environmental baseline through an annual review of project activities described in Section III - Environmental Baseline of this BO. Should annual monitoring determine the presence of ABB at Camp Maxey, the environmental baseline will be updated as per the terms and conditions of the Incidental Take Statement.

To this end, Camp Maxey will:

> 1) execute an adaptive management plan prior to the 2016 ABB survey season. It will incorporate elements of this BO, and any additional considerations appropriate for the

conservation of the ABB.

2) track project actions implemented as described in this BO, update the environmental baseline annually, and include this information in annual reports.

The Service will review the annual survey results and associated actions as required by the adaptive management plan and provide comments as appropriate.

Action Area

The action area is defined as the extent of the direct and indirect effects of a proposed action. The Service has determined that the action area for proposed action would be entirely within the 6,629-acre boundary of Camp Maxey.

II. Status of the species

The only federally listed species known to occur in Lamar County relevant to the proposed action are the endangered ABB and interior least tern *(Sternula antillarum*)(ILT).

Sightings of ILT in Lamar County have been documented only along the Red River to the north of Camp Maxey. Habitat for ILT could exist along the shoreline of Pat Mayse Lake or the numerous streams traversing the installation; however these would not be considered preferred habitats. Section 3.7 of the INRMP indicates that vehicular traffic and construction would be restricted from streambeds, wetlands, and floodplains and that bivouac and camping activities would be minimized within 25 feet of a water source. Additionally, the INRMP indicates it is highly unlikely ILT would be present at Camp Maxey, although a determination of affect is not provided. Based on the site visit by at Camp Maxey on July 16th, 2015, by Arlington Field Office, ILT are likely to be only transient at Camp Maxey. For these reasons, the Service believes the proposed action *is not likely to adversely affect* ILTs. Therefore, this species will not be discussed further in this BO, and no take of this species is authorized. The federally-listed species that may be affected by the proposed action is the ABB.

A. Species description

The ABB was proposed for 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 is the largest species of its genus in North America, measuring one 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.

B. Life history

1. Summer Active Period

ABBs are typically active at night from mid-May to late-September when nighttime ambient temperatures are consistently above 60°F. Nightly activity is most predominant from two to four hours after sunset (Walker and Hoback 2007). Weather, such as rain and strong winds, result in reduced ABB activity. 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 after this is completed (once larvae enter pupae phase), adult ABBs emerge and search for food.

2. Winter Inactive Period

During the winter months, when the nighttime ambient temperature is consistently below 60°F, ABBs bury themselves into the soil and become inactive (USFWS 1991). This typically occurs in late September lasting until mid-May. 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 overwintering results in significant mortality (Bedick et al. 1999). However, winter mortality has only recently begun to be investigated, but may range from 25% to about 70% depending on year, location, and availability of carrion in the fall (Schnell et al. 2008; Raithel unpubl. data).

3. Feeding

When not involved with brood rearing, adult food sources include an array of available carrion, as well as capturing and consuming live insects. Carrion selected by the ABB for reproduction tends to be larger than that used by other burying beetles. Preferred carrion sources are dead birds and mammals weighing from 1.7-10.5 ounces, with an optimum weight of 3.5-7.0 ounces (USFWS 1991). *Nicrophorus* species are capable of finding a carcass between one and 48 hours after death at a distance up to two 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. (1993a) recorded ABBs traveling as much as two miles during one night. Creighton and Schnell (1998) found that the mean distance recaptured ABBs moved from their original site of captures was 1.66 miles, with a minimum distance of 0.01 mile in one night to a maximum distance 6.2 miles over a six 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 diverse array 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).

4. Habitat

ABBs are considered feeding habitat generalists and have been successfully live-trapped in several vegetation types including undisturbed grasslands, grazed pasture, riparian zones, and oak-hickory forest, as well as various soil types (Creighton et al. 1993b; Lomolino and Creighton

1996; Lomolino et al. 1995; NatureServe Explorer 2001; 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).

Soil conditions must be conducive to ABB excavation (Anderson 1982; Lomolino and Creighton 1996). In Arkansas and 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 (USFWS 1991; Creighton et al. 1993b). Soils in the vicinity of captures are all well drained and include sandy loam and silt loam, with a clay component noted at most sites. Level topography and a well formed detritus layer at the ground surface are common (USFWS 1991).

At Camp Gruber, Oklahoma, Schnell and Hiott (2002a) reported more ABB captures within the installation than at the disturbed perimeters. Also, Schnell and Hiott (2002b) conducted surveys within Weyerhaeuser lands in southeast Oklahoma and southwest Arkansas where they reported fewer ABBs along roads than in the interior of tree plots. At Fort Chaffee in Arkansas, Schnell and Hiott (2005) also noted that ABBs tended to avoid soils of less than 40 percent sand, greater than 50 percent silt, and greater than 20 percent clay.

5. Reproduction

For breeding, habitat preference studies in Oklahoma indicate ABBs select undisturbed, mature oak-hickory forests with substantial litter layers and deep, loose soils over grasslands or bottomland forests (Lomolino and Creighton 1996; Creighton et al. 1993b). 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. 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, compared to forested sites, which were buried closer to the surface just below the litter.

Reproductive activity occurs between mid-May and mid-August and commences once a proper 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 will bury carrion of about 3.5-7.0 ounces, within a brood chamber constructed around the carcass. Prior to carcass burial, ABBs may move the carrion laterally for up to three 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).

C. Status and distribution

At the time of listing in 1989, the prevailing theory on the ABB's decline was habitat fragmentation (USFWS 1991). 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 by changing the species composition and lowering the reproductive success of prey species required for reproduction. 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, raccoon, fox, opossum, and skunk, which compete with ABBs for available carrion. In the Midwest, windbreaks, hedgerows, park development, and urban planning have all provided new "edge" habitat for these scavengers, as well as for domestic and feral animals such as dogs and cats. All these animals take 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.

Although much of the evidence suggesting the reduction of carrion resources as a primary mechanism of decline is circumstantial, this scenario fits the temporal and geographical pattern of the disappearance of ABBs, and is sufficient to explain why ABBs declined while congeneric species did not. It has been shown that in a fragmented ecosystem, larger species are negatively affected before smaller species, a process which has been well documented with carrion and dung beetles in South America (Klein 1989).

Sikes and Raithel (2002) conducted a search for papers written and/or published during a 20-year period. They evaluated the following threats to the ABB: DDT/pesticide use, artificial lighting, pathogens, habitat alteration, habitat fragmentation, vertebrate competition, loss of ideal carrion, and congener competition. Walker and Hoback (2007) implicate invasive eastern red cedar and Jurzenski (2012) credits indirect pesticide contact with changes in brood size.

The Service concluded that the best explanation for the decline of ABBs involved habitat fragmentation, which reduced the carrion prey base and increased the vertebrate scavenger competition for this prey (USFWS 1991). Kozol (1990), Ratcliffe (1996), Amaral et al. (1997), Bedick et al. (1999), and other authors have reiterated this theme. ABBs are 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 smaller *Nicrophorus* species can breed on the more abundant smaller carcasses of 0.11 to 0.18 ounces (Trumbo 1992).

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 Kaulbars 1987). Records are known from Texas, north to Montana (single record in 1913) and the southern fringes of Ontario, Quebec, and as far east as Nova Scotia and Florida (Figure 2). 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 first documented record of the species in Texas is based upon a single record in the collection of Cornell University of a specimen collected in the 1930s in the Kingsville area (Quinn in litt. 2004). This record is somewhat dubious considering that it is undated, would have been collected at least 500 miles from the nearest other verified record in south Louisiana, and potentially skews the historical range into the Texas Gulf Coast area (Figure 2). In 2012, four specimens were discovered in the Drexel University invertebrate collection from the 1880s from the "Wichita River, Texas" (Abbott and Abbott 2012).

In 1994, Dr. Craig Rudolph lead several investigations of areas within east Texas suspected to contain suitable habitat but no ABBs were documented (Rudolph in litt. 1994). In December 2003, a single specimen was captured unexpectedly during a planning level insect survey for the

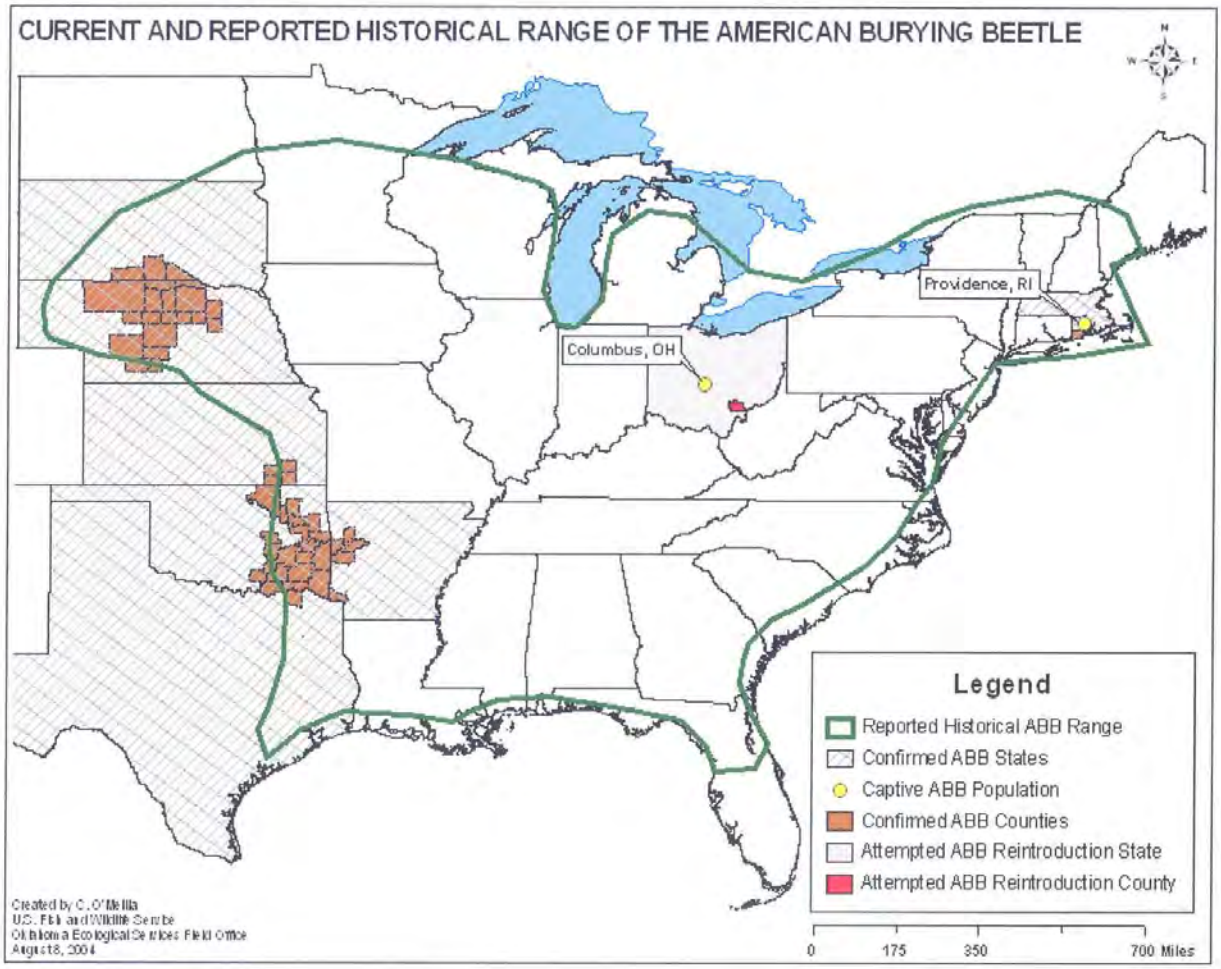

Figure 2. ABB Range Map

Texas Army National Guard at Camp Maxey (Godwin 2003). This record was the basis for the addition of the ABB to the list of federally-listed species in Texas. In 2004, surveys conducted by Godwin and Minich (2005) resulted in 34 captures at Camp Maxey and one capture at the Nature Conservancy property, Lennox Woods, in Red River County approximately 26 miles east of Camp Maxey; it has not been found since. Additional surveys describing the species status in Texas are described below in the Environmental Baseline.

During the 20th century, the ABB disappeared from over 90 percent of its historical range (Ratcliffe 1995). The last ABB specimens along the mainland of the Atlantic seaboard, from New England to Florida, were collected in the 1940s (USFWS 1991). 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, known populations were limited to Block Island and eastern Oklahoma.

Currently, the ABB is known to occur in only eight states: on Block Island off the coast of Rhode Island, Nantucket Island off the coast of Massachusetts, eastern Oklahoma, western Arkansas, Sand Hills in north-central Nebraska, 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). Most existing populations are located on private land.

Populations known to exist on public land include: Ouachita National Forest, Arkansas/Oklahoma; Ozark-St. Francis National Forests, Arkansas; 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.

An Industry Conservation Plan covering 45 counties in Oklahoma over two years was issued in 2014. This plan is anticipated to address oil and gas activities through the 2015 active season, and cover incidental take of enrolled projects for 20 years. In addition, ongoing research on the life history and status of the species, as well as activities by States and other partners contribute to the conservation of the species.

A more complete life history account of the ABB can be found on our website at www.fws.gov/southwest/es/Oklahoma/ABB_Add_Info.htm

III. Environmental Baseline

A. Status of the species within the action area

Camp Maxey lies within a narrow portion of the Northern Post Oak Savannah Ecoregion. The ABB population known from Camp Maxey is considered to be associated with a population which ranges across much of eastern Oklahoma and a portion of western Arkansas. Portraying the generalist nature of this species, this population ranges across a variety of habitat types found not only within the Northern Post Oak Savannah Ecoregion in Texas, but also within the South Central Plains, Ouachita Mountains, Arkansas Valley, Central Oklahoma/Texas Plains, Boston Mountains, and the Central Irregular Plains Ecoregions of Oklahoma and Arkansas.

The ABB is habitat generalist, capable of flying several miles in a single night, and may infrequently occur at Camp Maxey under favorable environmental conditions in unimproved areas. Based on an analysis of areas unsuitable for ABB (as noted in Section I - Description of Proposed Action), the estimated suitable habitat is approximately 5,972 acres. However, surveys in the past 8 years have not documented a consistent presence of the species in the action area.

Godwin and Minich's 2005 investigations of Camp Maxey resulted in a total of 223 capture events (415 trap nights, 0.53 ABBs per trap night). Population estimates for Camp Maxey were calculated for June, July, and August separately and resulted in estimated population sizes of 100.08, 290.2, and 79.0, respectively. Utilizing mark and recapture techniques, Godwin and Minich found that dispersals occurred in many different directions and recorded a high number of stationary recaptures. These results led the researchers to speculate that the population at Camp Maxey is endemic and a source population. Godwin and Minich also infer that no recaptures occurring between the three trapping periods would indicate that the total population is larger than at any one time estimate. ABBs caught in June may have left Camp Maxey or were underground with brood in July. The fact that no recaptures were made of June ABBs in August, which should be well after the brood period, would indicate that the populations are dispersing away from Camp Maxey (Godwin and Minich 2005).

In 2006, only 68 captures were recorded although 532 trap-nights were completed resulting in a success rate of 0.12 ABBs per trap night or a 30% reduction from 2005 (Godwin and Minich 2006). This apparent fluctuation may have been due to extended drought in the region and severe drought that summer. Additional surveys at other localities in the region failed to produce any ABB captures. This and other data collected in the region could indicate that Camp Maxey's

population does not extend more than 40 miles to the East, West, or South (Godwin and Minich 2006).

In 2007, 505 trap-nights yielded only 51 captures resulting in a success of 0.108 ABBs per trap night, a 49% reduction from the 2005 success rate (Randklev et al. 2007). This apparent fluctuation may be attributed to the continuing drought in the region.

In 2008, surveys over 1,530 trap-nights and caught eight ABBs, a survey success rate of only 0.0059 ABBs per trap-night (Bauer and Abbott 2008). Five beetles were marked, none were recaptured.

Surveys in 2009 found no ABBs in 1,275 trap-nights (Bauer and Abbott 2009). Only 75 per cent of other carrion beetles were captured compared to the previous year. Total beetle density and distribution were down considerably, contributing the difference to the continuing regional drought and high temperatures. *Nicrophorus* species, in particular, are known to be sensitive to dehydration (Bauer and Abbott 2009).

Bauer and Abbott (2010) captured no ABBs in 2010. However, notably high numbers of other *Nicrophorus* species were found in the sandy soils in the northern parts of the firing range. It was important to note that *Nicrophorus* avoided the recently burned areas of the sandy soil part of the range. Based on *Nicrophorus* reared in captivity, temperature is particularly important.

In 2011, no ABBs were captured over 84 trap-nights at the historically most active *Nicrophorus* sites on Camp Maxey (Abbott and Abbott 2011). There is a positive correlation between populations of *N. carolinus* and warmer temperatures/less rainfall and a negative correlation between populations of *N. orbicollis.* Additional research is needed to determine the temperature/precipitation habitat requirements of ABB.

Abbott and Abbott (2012) captured no ABBs during presence/absence surveys for ABBs in 2012. At three different habitat sites, 17 pitfall traps caught144 *Nicrophorus* beetles in 119 trap-nights; 142 *N. carolinus*, one *N. pustulatus* and one *N. orbicollis.*

In 2013, surveys over 156 trap-nights in July and August using 26 traps produced no ABBs (Abbott and Abbott 2013). With a continuing decrease in average maximum mean temperature there was a decrease in the number of *N. carolinus* per trap night and an increase in *N. orbicollis* as predicted in 2012. Speculation was made as to the increase in *N. orbicollis* and reoccurrence of ABB if average high temperatures continue to fall.

Again in 2014, captured no ABBs in 250 trap-nights; 159 *N. carolinus,* three *N. pustulatus,* and one each *N. orbicollis, N. tomentosus,* and *N. marginatus* were captured (Abbott and Abbott 2014). The trending capture rate for *N. carolinus* and other *Nicrophorus* species continues from previous years.

B. Factors affecting species environment within the action area

In addition to the military operations, the following activities in the action area:

1. Scientific research and reporting

Federally-permitted individuals appointed by Camp Maxey conduct annual population surveys and seek to determine habitat use and migration patterns through activities that include pitfall trapping, mark-recapture analysis, and/or extraction of genetic material. Any take of ABBs associated with these activities are covered by the researcher's section 10 permit(s) issued by the Service. Results are reported to the Service annually.

2. Feral Hogs

Feral hogs require continuing management at Camp Maxey and were first documented by training site staff in the 1980s. They compete for food with native wildlife, kill ground nesting birds and destroy their habitat, damage riparian areas while creating erosion and increased sedimentation, prey on small animals such as young wildlife and domestic animals, carry various diseases and parasites, and have been found to damage ranges. There is a control program in place at Camp Maxey, which is coordinated between the training site manager and Natural Resources personnel. Despite an active control program, their numbers seem to be increasing as they are across the region (TXARNG 2006). Feral hogs can negatively impact ABBs through competition for available carrion and soil disturbance while foraging. Feral hogs may displace inactive, brooding, or overwintering ABBs while foraging and possibly consume unearthed individuals or broods.

3. Red Imported Fire Ants

Scott et al. (1987) examined the importance of ants as competitors of burying beetles. Ants are abundant omnivorous scavengers and occupy many habitats. Ant colony size is often large and many species have quick recruitment systems that allow them to occupy and defend small vertebrate carcasses. Although the sensitive chemoreceptors of *Nicrophorus* beetles allow them to locate carrion over long distances, the high density of foraging ant species with well-developed trail communications and chemical or aggressive defense resources may bring burying beetles and ants into direct competition for small vertebrate carcasses. Ants are particularly abundant at southern latitudes, where competition between ants and *Nicrophorus* beetles will be more acute. The RIFA 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). The diet of foraging worker ants consists of dead animals, including insects, earthworms and vertebrates (Collins and Scheffrahn 2005). Vinson and Sorenson (1986) note that RIFAs may reduce ground-nesting populations of rodents and birds, and in some instances, may completely eliminate ground-nesting species from a given area. Ongoing efforts have reduced the level of RIFA on ranges; however, they are prevalent throughout Camp Maxey (TMS 2010). RIFAs seem to prefer disturbed or landscaped areas; therefore, ground disturbance from military training and INRMP activities could promote the abundance of RIFA at Camp Maxey.

4. Wildfire

Wildfires originating off-site usually result in the burning of some acreage within the action area each year and may adversely impact ABBs at Camp Maxey for reasons discussed in the following section. Wildfires started by lightning or other natural sources originating within the action area may also burn some portion of the installation annually. Recent wildfire activity is considered when planning prescribed fires and frequently results in a reduction in annual prescribed fires.

IV. Effects of the Action

Under section 7(a)(2) "effects of the action" refers to the direct and indirect effects of an action on a species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action. The impacts discussed below are the Service's evaluation of the direct and indirect effects of the proposed action. Indirect effects are those caused by the proposed action, occur later in time, but are still reasonably certain to occur (50 CFR 402.02).

Direct and indirect effects on the species may vary depending on many factors (e.g., duration and intensity of use, magnitude of impact, level of maintenance), but can generally be described as short-term or long-term. Short-term effects involve actions for which there is a level of understanding of the nature of effects that can be reasonably predicted (e.g., fire effects on suitable ABB habitat). These effects are largely based on vegetation recovery or duration of training exercises and may be self-mitigating if habitat is restored or allowed to recover to pre-disturbance conditions. Long-term effects are associated with actions that may continue indefinitely as part of the training mission. These effects are not easily evaluated because the duration is not easily predicted (e.g., soil compaction from ground exercises). Direct effects resulting in adult or juvenile mortality are difficult to predict and may be highly unlikely. Anticipated effects during the five-year life of the project are discussed below. The aforementioned adaptive management section will be used to address uncertainty within the effects evaluated. Monitoring of ABB presence is expected to inform the adaptive management process and implementation of the terms and conditions.

A. Direct effects

1. Military training activities

a. Dismounted maneuver training: foot traffic, bivouacking, and land course use

Given that there are currently 400 beds, it is anticipated that approximately 400 soldiers could be stationed at Camp Maxey at any time for a typical duration of approximately two weekends each month and four continuous weeks per year. Because adult ABBs likely spend daylight hours beneath shallow leaf litter and not at brooding/overwintering depths, daytime infantry training could encounter them during the ABB active season, May to September. However, due to the random dispersal of ABB individuals and the low frequency of annual training, as well as the decreased potential for impacts during the ABB inactive season, foot traffic impacts to ABB individuals is likely a rare event. Likewise, ground disturbance impacts from light maneuver infantry training activities day or night occur primarily on existing roads, land courses, and bivouac areas where ABBs are less likely to occur. Given these factors, coupled with the lack of any observational data of ABBs occurring during infantry training activities, resulting impacts would be at such a small scale that they could not be detected or measured. Thus, the nominal probability that any of these activities would adversely affect the ABB at a location where an ABB simultaneously happened to occur is extremely unlikely to occur and is considered insignificant; therefore, no take of ABBs is expected to occur as a result of these activities.

b. Heavy maneuver training: activities resulting in soil disturbance detrimental to ABBs

Soil disturbing activities related to heavy maneuver training in the action area is likely to have adverse impacts to the species. Adverse impacts which result in displacement of soils could uncover ABBs exposing them to predation, adverse environmental conditions, or crushing by equipment. When these activities occur during the active season, ABB broods could be displaced during soil excavation; adults could be separated from larvae/eggs, and/or crushed by equipment. Camp Maxey estimates that adverse effects from heavy maneuver activities will occur on approximately 800 acres (12% of the installation). Monitoring associated with adaptive management plans will estimate which areas are likely occupied on an annual basis.

The use of wheeled vehicles outside of existing maintained areas during training that result in soil compaction may destroy ABB brood chambers, including adults and larvae. Continued use of the same vehicle paths over time could render the soil unusable for carrion burial during the reproductive season. If such compactions take place during the ABB inactive season, buried adult individuals could be adversely impacted and/or ABB re-emergence in late spring or early summer could be prohibited.

Additionally, the use of these motor vehicles during training can lead to the accidental spilling of petroleum products and chemicals which may contaminate the soil creating unsuitable habitat, directly killing individuals or their broods, or displacing individual to less suitable areas. A Spill Prevention, Control, and Countermeasure Program is utilized to ensure that spill-related impacts of this type are an extreme rarity (D. Johnson, pers. comm. 2008). Potential adverse impacts to ABBs from vehicle-use training activities are expected to be rare or infrequent with soldiers training typically no more than approximately two weekends/month on average and four continuous weeks per year of which less than 10% of this time might involve off-road vehicle use.

c. Miscellaneous training related effects

Artificial lighting has been shown to disturb nocturnal insects' essential activities including migration, dispersal, foraging, mating, and reproduction (Anschutz et al. 2007). Anshutz et al. (2007) also demonstrated within a laboratory setting that ABBs will be most attracted to light that contains high levels of ultraviolet wavelengths. Their results also indicated that ABBs' foraging/reproduction behavior may be significantly interrupted by the presence of lights in the environment and that ABBs were more affected by light than other species of carrion beetle. For these reasons coupled with the fact that the ABB is highly mobile for an insect, the use of artificial lighting at Camp Maxey may have adverse effects on ABBs. The extent of adverse effects may be limited due to the majority of permanent lighting being restricted to the cantonment area and Ammunition Supply Point.

2. Prescribed Fire

The use of prescribed fire as a management tool for ecosystem health and training sustainability at Camp Maxey may likely have an overall benefit to the ABB population. Horn (pers. comm. 2006) found no measurable long-term impact of prescribed fires on two congeneric species of burying beetle (*N. orbicollis* and *N. tomentosus*) in mixed-oak forests in southern Ohio; however, temporary adverse impacts may occur. As is typical with prescribed fire, its application at Camp Maxey is variable in terms of area burned and timing (D. Johnson, pers. comm. 2007). However, no more than one-third of the total action area (1,989 acres) would be burned in a given year. For public safety reasons current plans call for new fire breaks and firefighting vehicle access along portions of the boundary currently without these structures; separating Camp Maxey from wildfires arriving from off site and the public from fast moving wildfires originating on Camp Maxey that could strand individuals and groups of people on peninsulas into Pat Mayse Reservoir, north of the action area.

Effects from prescribed fires are considered short term, but may result in the mortality of adult ABBs during their active period. As mentioned previously, ABBs likely spend portions of the year when daytime temperatures reach 60° F or higher in shallow leaf litter or soil and would not be expected to utilize energy reserves to dig a burrow, as they would when they overwinter or raise a brood. For this reason, ABBs may be consumed by fire within each of the habitat types periodically burned at Camp Maxey during their summer active period. Because the ABB is

highly mobile for an insect species, it is possible that individuals may be able to escape an approaching fire although this is unclear. Additionally, the burned habitat may be temporarily unsuitable for ABBs and their prey in terms of providing cover and feeding opportunities for either.

During their inactive period (typically September 20 to May 20), ABBs are generally below ground, although one year the first ABB encountered at Camp Maxey was captured in December (Godwin 2003) extending the known current range further into southern climate conditions. It is also unclear as to what depth they overwinter. Research by Schnell et al. (2008) tracked the overwintering behavior of ABBs. Of their sample of 104 overwintering ABBs (of which 62 survived the overwintering period) "many surviving beetles were at or near the surface" with an average burial depth of 2.4 inches. Considering the discrepancy of the timing of the overwintering period raised by the December capture and the apparent variability in overwintering burial depth indicated by the aforementioned study (as well as the lack of data regarding the depth needed to insulate ABBs from the heat of a prescribed fire), it is difficult to estimate injury or mortality levels of ABBs from the application of prescribed fire during the inactive period. However, it is reasonable to expect some injury or mortality to occur in areas where the species is present.

The TXARNG uses prescribed fire to aid in reestablishing and revitalizing Camp Maxey's native grasslands and savannahs. The majority of winters in this part of Texas have proven wet enough to preclude TXARNG from burning the required acreage. Research and past experiences indicate that winter burns benefit smooth sumac and other invading shrubs rather than killing them (Tunnell et al. 2006, Miles et al. 1997). Conducting growing season burns in conjunction with other methods are necessary to control these shrubs (Tunnell et al. 2006, Miles et al. 1997) and ensure the required acreage can be burned each year. The TXARNG therefore is planning on reducing acreage of prescribed fire in winter and conducting a majority of such burns during the growing season. Improved habitat conditions resulting from the burns would benefit the ABB where it reestablishes its presence on Camp Maxey.

3. Pesticide/herbicide use

The use of insecticides and herbicides may have adverse impacts to ABBs depending on the type applied and the proper application. RIFAs are specifically targeted within the INRMP as an invasive species in need of management through the use of pesticide. Application of pesticides to control RIFAs would be in the form of bait applied to individual mounds. The RIFA Treatment Protocol within the INRMP indicates that when RIFA exist at less than 30 mounds per acre, individual mound bait treatments are used at the label rate. At 30-120 mounds per acre, bait is broadcast spread at half the label rate while at greater than 120 mounds per acre, the full label rate should be broadcast spread. The RIFA Treatment Protocol also indicates that the recommended pesticide chemicals are hadramethylnon, avermectin and methoprene. Although each of these is commercially available in an ant-specific formula, they all are known to have deleterious effects to non-target invertebrate species as well (Glare and O'Callaghan 1999; Vander Meer et al. 2007; Hooper-Bui et al. 2007). Adverse effects to ABBs from the application of pesticides as described in the INRMP would likely be negligible. Because ABBs are attracted to carrion as a food/reproduction source and other insects as an additional food source, it is unlikely that the attractants in ant-specific pesticide baits would elicit a response from ABBs. Ant-specific baits are typically in the form of a toxicant dissolved in soybean oil which is then applied to corncob grit (National Sustainable Agriculture Information Service 2007). Once applied, each of the chemicals (hadramethylnon, avermectin and methoprene) identified in the INRMP are considered to rapidly degrade in the soil largely through exposure to UV light

(Extension Toxicology Network 1996), further reducing the probability of ingestion by ABBs. Frequency of application would not typically exceed once every six months if total recolonization occurred (INRMP 2006). Adverse impacts to brooding ABBs would also be unlikely because each of these chemicals has been shown not to appreciably leach into the soil after application (Extension Toxicology Network 1996). Local use of other pesticides within and upon the outside surface of infrastructure to control nesting wasps, cockroaches, etc., would likely have no effect on ABBs.

Controlled use of herbicides to kill smooth sumac and other shrubs, in conjunction with prescribed fire, is also needed to improve and reestablish Camp Maxey's native grasslands and savannahs. Non-native invasive species including Chinese privet *(Ligustrum sinense)* and Japanese honeysuckle *(Lonicera japonica)* have become well established on Camp Maxey and are now a management issue. Addressing these issues will require the judicious and controlled use of insecticides and herbicides. All use of pesticides will be in accordance with the Camp Maxey INRMP and the Integrated Pest Management Plan, and with prior review and approval of the Integrated Pest Management Coordinator.

For these reasons, the Service anticipates that significant impacts are extremely unlikely to occur to ABBs from pesticide/herbicide use at Camp Maxey. All activities involving pesticides or herbicides will be very controlled and considered discountable. Therefore, the Service concludes that pesticide/herbicide use at Camp Maxey as described in the INRMP would not be expected to result in incidental take of ABBs. Management efforts of RIFA at Camp Maxey would be expected to have an overall net benefit to the ABB population by reducing competition for prey items, supporting the health of the prey population, and reducing the potential threat of killing/harassment of ABBs by RIFAs.

4. New infrastructure projects

Additional impacts may result from the construction of new facilities, ranges and/or range improvements inside the action area. Such activities producing soil disturbance and/or soil compaction may result in adverse impacts to ABBs as previously described in the heavy maneuver training section. Likewise, the conversion of existing suitable ABB habitat to a maintained area may likely render that habitat unsuitable for ABBs. ABBs are highly mobile and drawn to carrion and are able to reproduce in soils that allow burrowing and burial of carrion. New infrastructure reduces these areas, precluding any present ABB from utilizing previously available habitat for breeding, brood-rearing, or access to available carrion; thus resulting in a loss of reproductive success. Camp Maxey has estimated these projects would not exceed 250 acres over the next 5 years. Monitoring associated with adaptive management plans will estimate which areas are likely occupied on an annual basis.

B. Indirect effects

The ABB can be indirectly affected by limitation or reduction in available carrion; harassment during breeding, brood rearing, or overwintering; or removal of suitable habitat. Although the ABB appears to use various habitat types, the role of vegetation composition and soil type as a limiting factor is unclear. The availability of suitable carrion, however, has been implicated as a limiting factor. Predators such as feral and domestic dogs and cats, crows, coyotes, foxes, skunks, opossums, or raccoons are opportunistic feeders and can compete with the ABB for available carrion. These species thrive along edges and in diverse habitat types. Any activities

which promote the creation of edge habitats may have the direct effect of increasing edge habitat for competing predators which could have an indirect effect on the ABB.

C. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. 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. All known future actions on Camp Maxey would be Federal actions. Therefore, they are either covered by or would require additional consultation, therefore cumulative effects have not been identified.

V. Conclusion

In the absence of a population of ABB at Camp Maxey, incidental take is not expected. Thus, proposed actions described in this BO, as well as the associated potential effects, are only anticipated when ABBs are determined through annual pitfall trap surveys (during the active period) to be occupying Camp Maxey, as described in the adaptive management process.

When Camp Maxey is determined to be occupied, harm and/or harassment to ABBs resulting from the proposed actions would only occur on a portion of the ABBs known range. The action area is also actively managed by TXARNG to maintain natural resources and ecosystem health in support of military training. Because no more than one third of the total action area would be burned per year and most impacts would be relatively small and isolated, as well as the generalist nature of this species, natural relocation opportunities for potentially displaced ABBs would likely be available within the action area. Likewise, most impacts would be temporary and infrequent and some would likely result in an overall net benefit to ABBs.

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 TXARNG's proposed military training activities at Camp Maxey and the implementation of the Camp Maxey INRMP is not likely to jeopardize the continued existence of the ABB. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined 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 the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by TXARNG (applicant) on behalf of the Army National Guard (Federal agency) so that they become binding conditions for any action, grant, or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. TXARNG has a continuing duty to regulate the activity covered by this incidental take statement. If TXARNG (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, TXARNG must report the 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

Using the adaptive management process, take is estimated by the effects of the action on a population occurring on Camp Maxey within the five-year term of this opinion. Thus, in this section, the take is estimated under the assumption the ABB is occupying all or portions of the action area. No take is expected to occur when annual monitoring determines the ABB is not present in the action area during the calendar year.

Take, in the form of harm and/or harassment, is difficult to quantify and usually cannot be estimated in terms of numbers of individuals. Consequently, the Service believes using habitat area as a surrogate for take should be employed as the best method to quantify the amount of take that is likely to occur. Using habitat as a surrogate for incidental take of individuals is consistent with the ESA section 7 implementing regulations at 50 CFR 402.14(i)(1)(i) for the following reasons: 1) the ABB has a small body size making it hard to locate, which makes encountering dead or injured individuals unlikely; 2) ABB losses may be masked by annual fluctuations in numbers and active season dispersal; and 3) ABBs spend a substantial portion of their lifespan underground.

Take, in the form of harm and/or harassment, of ABBs may occur from training and other training related use (primarily heavy maneuver training activities), and/or similar facilities management activities that temporarily degrade suitable habitat (outside the currently maintained areas) to the point where individual ABBs are killed or injured, and the habitat is rendered unsuitable for a period greater than or equal to one breeding season. Harm and harassment may occur when ABB are active at Camp Maxey and training activities injure or kill individuals, any remaining individuals likely precluded from utilizing habitat for breeding, brood-rearing, or access to available carrion; thus resulting in a loss of reproductive success. As stated previously, non-vehicle infantry training, bivouacking, and use of existing maintained areas will not be included as activities with potential to result in take of ABBs.

Impacts to the ABB resulting from of soil disturbance and compaction from wheeled vehicle-use training and/or other heavy equipment operation in the action area may occur. Off-road vehicle operation is rare during weekend drills and is primarily performed during the longer annual training activities occurring four weeks per year on average. Based on known types of military training and likelihood of off-road activities, Camp Maxey estimates that adverse effects from military activities will occur on no more than 800 acres (12% of the installation) in order to accomplish the proposed action. Thus, in years where the species is present, the Service anticipates that individual ABBs on up to 800 acres of ABB habitat may be injured or displaced, and habitat temporarily made unsuitable for breeding, feeding, and sheltering ABBs as a result of soil compaction caused by vehicle/heavy equipment-use training and/or similar facilities

management activities as well as preparation and maintenance of landing zones and drop zones necessary for airborne operations. This estimate of annual loss of individuals on suitable habitat from soil compaction would not be considered cumulative across years given that impacts are of minimal frequency and not likely sustained, chronic events and that erosion control projects at Camp Maxey are employed to restore impacted areas to pre-disturbance conditions. A summary of potential impacts and their contribution to total incidental take is summarized in Table 1.

Table 1. Summary of incidental take of the American burying beetle resulting from proposed actions

Activity	Effect or type(s) of incidental take	Contribution to incidental take total
Summer prescribed fires during ABB active period May 15 to September 30	- Mortality of individuals consumed by fire - Harm and harassment through habitat made temporarily unsuitable, ultimately beneficial effect	All acreage burned annually
Winter prescribed fires during ABB inactive period October 1 to May 14	- Individuals consumed by fire within acreage burned - Habitat suitability unaffected, ultimately beneficial effect	All acreage burned annually
Soil disturbance and compaction resulting from heavy maneuver training	- Harm or harassment to Individuals impacted - Habitat made temporarily unsuitable	Total acreage of potential soil disturbance
New infrastructure within the action area	- Harm or harassment to individuals; Habitat made permanently unsuitable	Total acreage of new maintained areas

ABBs may also be killed or harmed during prescribed fires. Take resulting from prescribed fires may also occur in the form of harassment if temporarily unsuitable habitat conditions create the likelihood of injury to ABBs to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Summer burns and winter burns would differ in the types of impacts that could result in take of individuals and/or temporary loss of habitat as summarized in Table 1. As indicated in the letter requesting reinitiation of formal consultation, no more than one-third of the 5,972 acre facility would be burned each year using prescribed fire with the largest portion typically burned in the summer

months. Given these factors, the Service anticipates that take of individuals in the form of harm and/or harassment to the ABB could temporarily occur anywhere on 1,989 acres during the years that the species is present. Since the entire area is not likely to be occupied, the incidental take estimate is some proportion of the burned area, most likely to be occupied. During the years when the species is present, the occupied area and population should be estimated by the TXARNG prior to the initiation of prescribed fire. These estimates, along with projected fire impacts will be used to track and report incidental take. Because fire is an essential component of the natural landscape, it is expected that the temporary adverse effects of prescribed fire will be self-mitigating through the maintenance of ecosystem health and ultimately result in a net benefit to the ABB population at Camp Maxey. This estimate of take resulting from prescribed fires annually, and would not be considered cumulative across years given that impacts would be temporary and likely necessary to ensure long-term habitat function.

New infrastructure development, such as new ranges, ammunition storage facilities, and training facilities may permanently remove ABB habitat. When possible, new infrastructure development will occur in within the cantonment area and/or previously disturbed sites. Based on current plans and historical activities, approximately 250 acres over a five-year period of potential ABB habitat may be lost. Any individuals present are likely to be injured or killed, and individuals remaining precluded from utilizing the area for breeding, brood-rearing, or access to available carrion; thus resulting in a loss of reproductive success.

Based upon estimates by TXARNG detailed in the Biological Evaluation and the INRMP, information exchange between TXARNG and Service staff, and a review of publicly available information and scientific literature, it is anticipated that incidental take of the ABB may occur annually on no more than1,989 acres due to prescribed fire and 800 acres due to training within the action area in the form of harm and/or harassment. Annual incidental take resulting from prescribed fire and training is expected to be temporary and would not be cumulative over time. In addition, the annual incidental take will depend on the annual survey results provided through the adaptive management plan, but is not anticipated to exceed the above estimates. Incidental take of ABB resulting from infrastructure development is expected to occur on no more than 250 acres over five years.

Effect of the take

In the accompanying BO, the Service determined that the level of anticipated habitat take is not likely to result in jeopardy to the ABB.

Reasonable and prudent measures and Terms and Conditions

The Service believes the following non-discretionary reasonable and prudent measures are necessary and appropriate to minimize take of the ABB. The reasonable and prudent measures and terms and conditions are provided in two tiers based on the adaptive management process described in this BO.

In order to be exempt from the prohibitions of section 9 of the ESA, Camp Maxey must comply with the following terms and conditions, which implement the reasonable and prudent measures described and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary and must also be a condition of any Federal permits, contracts, or grants issued within the action area.

Tier 1 – Adaptive management plan determines absence of ABB at Camp Maxey

1. Reasonable and prudent measures are not required in the absence of the species. TXARNG will implement the action as proposed, including the adaptive management plan.

   a. No terms and conditions are required under Tier 1. The proposed adaptive management included in the proposed action will identify ABB occupancy at Camp Maxey and the need to implement Tier 2 terms and conditions.

Tier 2 – Adaptive management plan determines presence of ABB at Camp Maxey.

2. TXARNG will estimate acres of ABB occupancy and track the environmental baseline at Camp Maxey.

   a. Based on available information from survey data, occupancy will be estimated (occupied acres and estimated population) for the purpose of tracking incidental take. Environmental baseline will be tracked as per adaptive management plan.

3. TXARNG will implement monitoring of training areas for soil compaction due to motorized vehicle use.

   a. Develop a plan/process to annually monitor soil compaction off of existing roads and trails. The purpose would be to detect changes in soils not conducive to ABB burrows due to vehicle use.

4. Document strategies to limit the use of exterior lighting, especially with ultraviolet and blue spectra.

   a. during the active season, exterior lighting should be assessed for minimal use practices. Where lighting is necessary during the active season, bulbs that minimize ultraviolet and blue spectra should be used.

5. Planning of prescribed fires will utilize ABB data to avoid high ABB use areas during their active season.

   a. Fire planning will evaluate ABB distribution and habitat use on Camp Maxey. Areas identified as "high use" by ABB, will be avoided for prescribed fire during the active season.

6. Permanent infrastructure construction will be scheduled to avoid the ABB active season as much as possible.

   a. To the extent possible, and considering ABB distribution, abundance and activity, scheduling of construction for infrastructure will reduce the amount of time overlapping the ABB active season.

Reporting Requirements

Camp Maxey shall provide annual reports to the Service by January 31. The reports will include the following information:

1) results of ABB monitoring

2) summary of infrastructure projects implemented

3) summary terms and conditions implemented (as applicable)

4) updates to the environmental baseline

5) incidental take of ABB in habitat area (if applicable)

6) implementation of any conservation recommendations (if applicable)

Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. The conservation recommendations listed below are discretionary agency activities to minimize or avoid adverse impacts 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. Conduct research on the ABB coordinated with the Service. This might include an analysis of impacts potentially resulting from light pollution, prescribed fire, feral hogs, RIFA, analysis of habitat use, or burrowing behavior.
2. Plan support activities in a manner that limits impacts to the ABB and its habitat.
3. Expansion of improved facilities should be planned for those areas already impacted on the installation.
4. Disturbances and developments such as roads, recreation areas, towers, ditches, utilities, etc., should be designed to avoid fragmenting native habitat.
5. Avoid excessive use of insecticides and rodenticides from mid-May to September. Insecticide and rodenticide use should be limited to protect the health and safety of personnel and property. All chemicals should be hand applied to limit the area of effect. Exceptions may be made in those cases with potentially severe habitat loss due to pest infestations.
6. Responsible land management that maintains ecosystem health and functions should provide habitat preferred by the ABB and that provides potential carrion. Areas of hardwoods and native grasslands should be protected and increased whenever possible.
7. Units at Camp Maxey for prolonged (two week summer training) should be encouraged to select their own bivouac site, within broad limits, to avoid the re-use of the same site and subsequent soil compaction.

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 notification of the implementation of any conservation recommendations.

Reinitiation Notice

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency

involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates the cooperation extended by TXARNG staff and participating parties during this consultation. If further assistance or information is required, please contact Mr. Sid Puder or Omar Bocanegra at the letterhead address or telephone (817) 277-1100.

Sincerely,

Debra T. Bills

Debra Bills
Field Supervisor

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