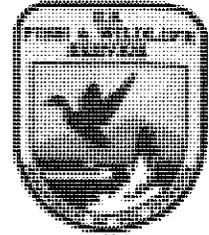




United States Department of the Interior



FISH AND WILDLIFE SERVICE
Rock Island Field Office
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Moline, Illinois 61265
Phone: (309) 757-5800 Fax: (309) 757-5807

IN REPLY REFER
TO:

FWS/RIFO

October 9, 2009

U.S. Army Corps of Engineers
Rock Island District
ATTN: Mr. Kenneth Barr
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Barr:

This document transmits our final biological opinion for the Public Notice CEMVR-OD-P-2006-1369, Ajinomoto Heartland, LLC application to expand their existing lysine and threonine plant near Eddyville, Iowa. Formal consultation under Section 7 of the Endangered Species Act was initiated by your office on June 9, 2009 since the project may impact the federally endangered Indiana bat (*Myotis sodalis*).

This biological opinion is based on U.S. Fish and Wildlife Service records and existing literature as well as information provided by your office, Howard R. Green Company, and Griggs Environmental Strategies.

If you have any questions or concerns regarding this consultation, please contact Kristen Lundh of this office at (309) 757-5800, extension 215

Sincerely,



Richard C. Nelson
Field Supervisor

Enclosure

cc: IADNR (Howell, Schwake)
COE OD-P (N. Johnson)
COE PM-A (Carmack)
Howard R. Green Company (McCaslin)

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BIOLOGICAL OPINION
FOR
PUBLIC NOTICE No. CEMVR-OD-P-2006-1369
Ajinomoto Heartland, LLC

SUMMARY OF FINDINGS

In this Biological Opinion, the U.S. Fish and Wildlife Service has determined that authorization of the activities described in the subject Public Notice and associated documents will not jeopardize the continued existence of the Indiana bat (*Myotis sodalis*), but will result in incidental take of this species.

By letter dated June 9, 2009, the U.S. Fish and Wildlife Service acknowledged the Biological Assessment findings that the project will have no effect on the prairie bush clover (*Lespedeza leptostachya*) and western prairie fringed orchid (*Platanthera praeclara*).

The subject Public Notice states that the project will involve the expansion of the existing Ajinomoto Heartland, LLC lysine and threonine plant located near Eddyville, Iowa. The actions associated with the project involve maternity habitat modification in the summer range of the Indiana bat.

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BACKGROUND

This consultation considers the impacts of tree removal in forested habitat utilized by one or more Indiana bat maternity colonies, and the filling of 0.9 acres of wetland and permanent conversion of 1,180 linear feet of intermittent stream channel to buried culvert system following authorization of the project under Section 404 of the Clean Water Act.

The Biological Assessment (BA) (McCaslin 2009) and Biological Opinion (BO) evaluate the effects to listed species and are intended to clarify any effects that may be insignificant individually, but in totality may be substantial, rise to the level of incidental take, or result in jeopardy or adverse modification of critical habitat. Specifically, the consultation evaluates how authorization of the project will alter current environmental conditions during and following completion of the project, and how these anticipated changes in environmental conditions will affect threatened and endangered species occurring within the action area.

Species Covered in this Consultation

This consultation covers the Indiana bat (*Myotis sodalis*). During informal consultation the U.S. Army Corps of Engineers (Corps) determined the prairie bush clover (*Lespedeza leptostachya*) and western prairie fringed orchid (*Platanthera praeclara*), would not be affected by the proposed project and need not be addressed further. By letter dated June 9, 2009, the U.S. Fish and Wildlife Service (Service) concurred with the Corps determination that the project may adversely affect the Indiana bat and would have no effect on other species listed above.

BIOLOGICAL OPINION

1. Description of the Proposed Action

The Corps proposes to permit in-stream and wetland work under Section 404 of the Clean Water Act on unnamed tributaries in Monroe County, Iowa. This action is described in Public Notice No. CEMVR-OD-P-2006-1369, dated March 5, 2009. The applicant for this permit is Ajinomoto Heartland, LLC (AHL). The applicant requires authorization by both Corps and the Iowa Department of Natural Resources (IDNR) to adversely impact 0.9 acres of wetland and 1,180 feet of stream while expanding a lysine and threonine production facility at Eddyville, Iowa. As described in the Public Notice, the expansion will include the construction of a new entrance road, construction of new wastewater treatment facilities, demolition of the existing entrance road stream and wetland impacts, and mitigation for natural resources.

For the purpose of this consultation, the Service considers the action area to be all areas affected by the plant expansion including new road construction and demolition, wetland mitigation areas, and a forest preservation area.

This consultation focuses on the actions resulting from authorizing the filling of wetlands, conversion of the stream channel to a culverted system, and subsequent conversion of portions of upland woodland to the expanded facilities.

1.1 Conservation Measures

Conservation measures to minimize harm to listed species which are proposed by the applicant or action agency are considered part of the proposed action and their implementation is required under the terms of the consultation. The following conservation measures were outlined in the February 2009 BA completed by Ted McCaslin of Howard R. Green Company, and adopted by the Corps and submitted to the Service as part of their request for formal consultation:

As Conservation Measures, the applicant proposes to:

1. Design plant facilities to minimize impacts to timber areas.
2. Conduct all tree clearing activities from September 16 through April 14 to avoid direct impacts to Indiana bats.
3. Install erosion control measures to prevent erosion, siltation and degradation of adjacent wildlife habitat areas.
4. To compensate for the loss of 16 acres of suitable Indiana bat habitat, AHL is proposing habitat improvements adjacent the proposed construction site. This includes planting 4.2 acres of trees, and preserving 19.5 acres of trees within the same small watershed where trees will be cleared.

2. Status of the Species

This section presents the biological or ecological information relevant to formulating the BO. Appropriate information on the species' life history, its habitat and distribution, and other data on factors necessary to its survival are included to provide background for analysis in later sections. This analysis documents the effects of past human and natural activities or events that have led to the current range-wide status of the species. Portions of this information are also presented in listing documents, the recovery plan (USFWS 1983) and the draft revised recovery plan (USFWS 1999), and are referenced accordingly.

2.1 Species/Critical Habitat Description

The Indiana bat (*Myotis sodalis*) was listed as an endangered species on March 11, 1967 (Federal Register 32[48]:4001) under the Endangered Species Preservation Act of October 15, 1966 (80 Stat. 926; 16 U. S. C. 668aa[c]). Eleven caves and two mines in six states were listed as critical habitat on September 24, 1976 (41 FR 41914). These sites along with other known hibernacula were classified in the Indiana Bat Recovery Plan as Priority One, containing at least 30,000 bats; Priority Two, containing 1000 to fewer than 30,000; and Priority Three with less than 1,000 bats (USFWS 1983). In the 1999 draft revised Recovery Plan, the Priority Two lower limit was reduced to 500 bats. In summary, the objectives of the Recovery Plan are to: (1) protect hibernacula; (2) maintain, protect, and restore summer maternity habitat; and (3) monitor population trends through winter censuses.

2.2 Life History

The Indiana bat is a medium-sized bat with a head and body length that ranges from 41 to 49 mm. The fur is described as dull pinkish-brown on the back, and somewhat lighter on the chest and belly. The ears and wing membranes do not contrast with the fur (Barbour and Davis 1969). There are no recognized subspecies. Generally, Indiana bats hibernate from October through April (Hall 1962, LaVal and LaVal 1980), depending upon local weather conditions. Figure 1 provides a depiction of the annual cycle. They hibernate in large, dense clusters, ranging from 300 bats per square foot to 484 bats per square foot (Clawson et al. 1980, Clawson, pers. observ. October 1996 in USFWS 2000). Upon arrival at hibernating caves in August-September, Indiana bats "swarm", a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn, with relatively few roosting in the caves during the day (Cope and Humphrey 1977). Swarming continues for several weeks and mating occurs during the latter part of the period. Fat supplies are replenished as the bats forage prior to hibernation.

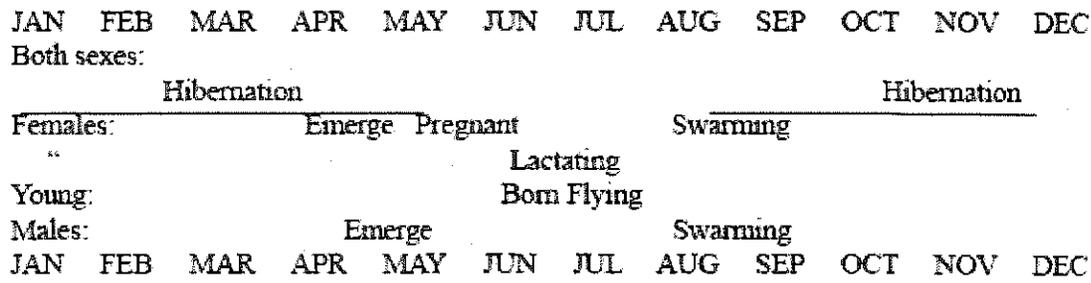


Figure 1. Indiana Bat Annual Chronology

Indiana bats tend to hibernate in the same cave at which they swarm (LaVal et al. 1976), although swarming has occurred at caves other than those in which the bats hibernated (Cope and Humphrey 1977). During swarming, males remain active over a longer period of time at cave entrances than do females (LaVal and LaVal 1980), probably to mate with the females as they arrive. After mating, females enter directly into hibernation. A majority of bats of both sexes hibernate by the end of November, and by mid-October in northern areas (Kurta, pers. observ. June 1997). Hibernacula populations may increase throughout the fall and even into early January (Clawson et al. 1980).

Adult females store sperm through the winter and become pregnant via delayed fertilization soon after emergence from hibernation. Young female bats can mate in their first autumn and have offspring the following year, whereas males may not mature until the second year. Limited mating activity occurs throughout the winter and in late April as the bats leave hibernacula (Hall 1962).

Females emerge from hibernation ahead of males; most winter populations leave by early May. Some males spend the summer near hibernacula in Missouri (LaVal and LaVal 1980) and West Virginia (Stihler, pers. observ. October 1996, in USFWS 2000). In spring when fat reserves and food supplies are low, migration is probably hazardous (Tuttle and Stevenson 1977). Consequently, mortality may be higher in the early spring, immediately following emergence.

Females may arrive in their summer habitats as early as April 15 in Illinois (Gardner et al. 1991a, Brack 1979). During this early spring period, a number of roosts (e.g., small cavities) may be used temporarily, until a roost with larger numbers of bats is established. Humphrey et al. (1977) reported that Indiana bats first arrived at their maternity roost in early May in Indiana, with substantial numbers arriving in mid-May. Parturition occurs in late June and early July (Easterla and Watkins 1969, Humphrey et al. 1977) and the young are able to fly between mid-July and early August (Mumford and Cope 1958, Cope et al. 1974, Humphrey et al. 1977, Clark et al. 1987, Gardner et al. 1991a, Kurta et al. 1996).

Female Indiana bats exhibit strong site fidelity to summer roosting and foraging areas. That is, they return to the same summer range annually to bear their young. Females typically utilize larger foraging ranges than males (Garner and Gardner 1992). Prior to the survey conducted for this project, maternal activity had been recorded at 26 locations in Iowa and approximately 246 locations range-wide (King 2007), based on the capture of reproductive females (pregnant or lactating). Currently, the top five States by total records are Indiana (83), New York (32), Kentucky (32), Illinois (28), and Iowa (26).

Trees in excess of 16 inch diameter at breast height (dbh) with exfoliating bark are considered optimal for maternity colony roost sites, but trees in excess of 9 inch dbh appear to provide suitable maternity roosting habitat (Romme et al. 1995). Cavities and crevices in trees may also be used for roosting. In Illinois, Gardner et al. (1991) found that forested stream corridors and impounded bodies of water were preferred foraging habitats for pregnant and lactating Indiana bats.

After the summer maternity period, Indiana bats migrate back to traditional winter hibernacula. Some male bats may begin to arrive at hibernacula as early as July. Females typically arrive later and by September the number of males and females are almost equal. Autumn "swarming"

occurs prior to hibernation. During swarming, bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in the caves during the day. By late September many females have entered hibernation, but males may continue swarming well into October in what is believed to be an attempt to breed with late arriving females.

Male Indiana bats may be found throughout the entire range of the species. Males appear to roost singly or in small groups, except during brief summer visits to hibernacula. Males have been observed roosting in trees as small as 3 inch dbh.

2.3 Diet and Foraging

Indiana bats forage over a variety of habitat types but prefer to forage in and around the tree canopy of both upland and bottomland forest or along the corridors of small streams. Bats forage at a height of approximately 2-30 meters under riparian and floodplain trees (Humphrey et al. 1977). They forage between dusk and dawn and feed exclusively on flying insects, primarily moths, beetles, and aquatic insects. Females in Illinois were found to forage most frequently in areas with canopy cover of greater than 80% (Garner and Gardner 1992). The species feeds on flying insects, both aquatic and terrestrial. Diet appears to vary across the range, as well as seasonally and with age, sex, and reproductive status (Murray and Kurta 2002, Lee 1993, Belwood 1979). Murray and Kurta (2002) found that diet is somewhat flexible across the range and that prey consumed is potentially affected by regional and local differences in bat assemblages and/or availability of foraging habitats and prey.

For example, Lee (1993) and Murray and Kurta (2002) found that adult aquatic insects (Trichoptera and Diptera) made up 25-81% of Indiana bat diets in northern Indiana and Michigan. However in the southern part of the species range, terrestrial insects (Lepidoptera) were the most abundant prey items (as high as 85%) (Lee 1993, Brack and LeVal 1985, LaVal and LaVal 1980, Belwood 1979). Kiser and Elliot (1996) found that Lepidopterans (moths), Coleopterans (beetles), Dipterans (true flies), and Homopterans (leafhoppers) accounted for the majority of prey items (87.9% and 93.5% combined for 1994 and 1995, respectively) consumed by male Indiana bats in their study in Kentucky. Diptera, Trichoptera, Lepidoptera, and Coleopterans also comprised the main prey of Indiana bats in Michigan (Murray and Kurta 2002); however, Hymenopterans (alate ants) were also taken when abundant.

Reproductively, active females and juveniles exhibit greater dietary diversity than males and non-reproductively active adult females. Lee (1993) found that reproductively active females eat more aquatic insects than adult males or juveniles in Indiana. These differences in dietary demands between age groups, sex, and reproductive stage is perhaps due to higher energy demands of reproductive females and juveniles. Male Indiana bats summering in or near hibernation caves feed preferentially on moths and beetles.

2.4 Range

The species range includes much of the eastern half of the United States, from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida. The Indiana bat is migratory and the above described range includes both winter and summer habitat. The winter range is associated with regions of well-developed limestone caverns. Major populations of this species hibernate in Indiana, Kentucky, and Missouri. Smaller winter populations have been reported

from Alabama, Arkansas, Georgia, Illinois, Maryland, Mississippi, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Virginia, and West Virginia. More than 85% of the entire known population of Indiana bats hibernates in only nine caves.

2.5 Population Dynamics

Based on censuses taken at all hibernacula, the total known Indiana bat population in 2007 was estimated to number about 457,000 bats (USFWS 2009). Indiana bat populations were first surveyed in the late 1950s (Hall 1962), and since the Indiana bat's original listing and standardized winter surveys began in the early 1980's, the Indiana bat's overall population decreased precipitously by 57% (Clawson 2002) until an increasing population trend began in 2003 (Table 1).

Regional trend disparities noted by Clawson (2002) still exist between northern and southern populations. The most severe declines in wintering populations have occurred in two states: Kentucky, where 200,200 bats were lost between 1960 and 2001, and Missouri, where 326,000 Indiana bats were estimated to be lost in the same period. In Indiana, populations dropped by 50,000 between the earliest censuses and 1980, but have returned to former levels in recent years. Currently, almost half of all the hibernating Indiana bats in existence (approximately 173,100) winter in Indiana.

Table 1. Indiana bat rangewide population estimates (Data sources: 1965-1990, Clawson 2002; 2001-2005). Rangewide estimates calculated from all known hibernacula were not attempted or data was not available for most years prior to 2001 and are not included.

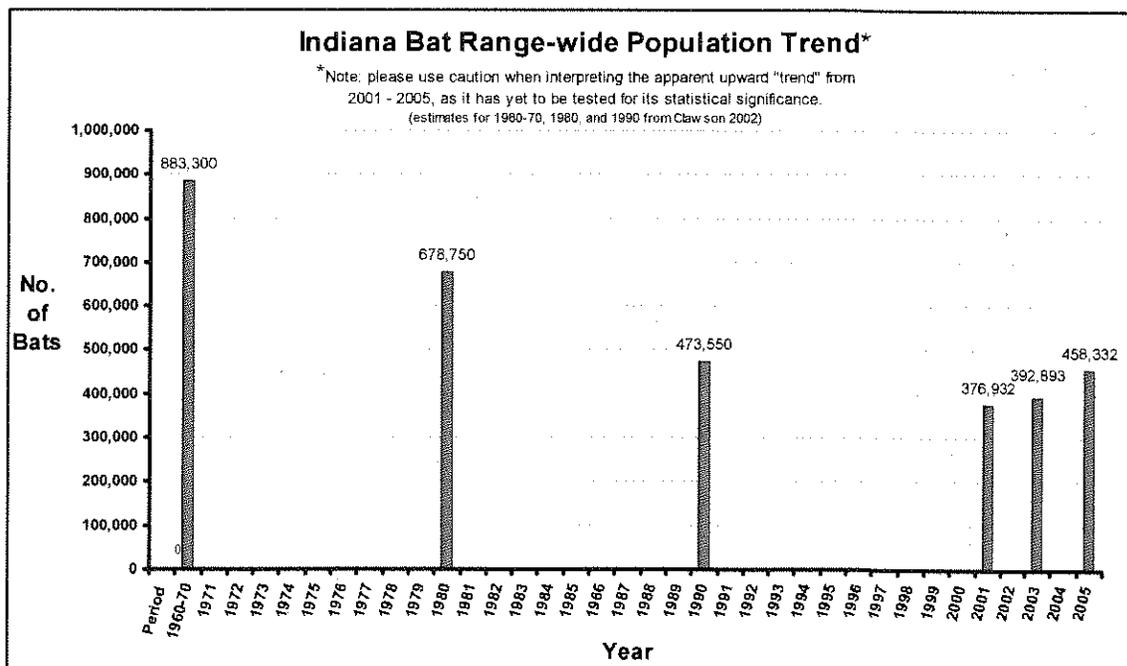
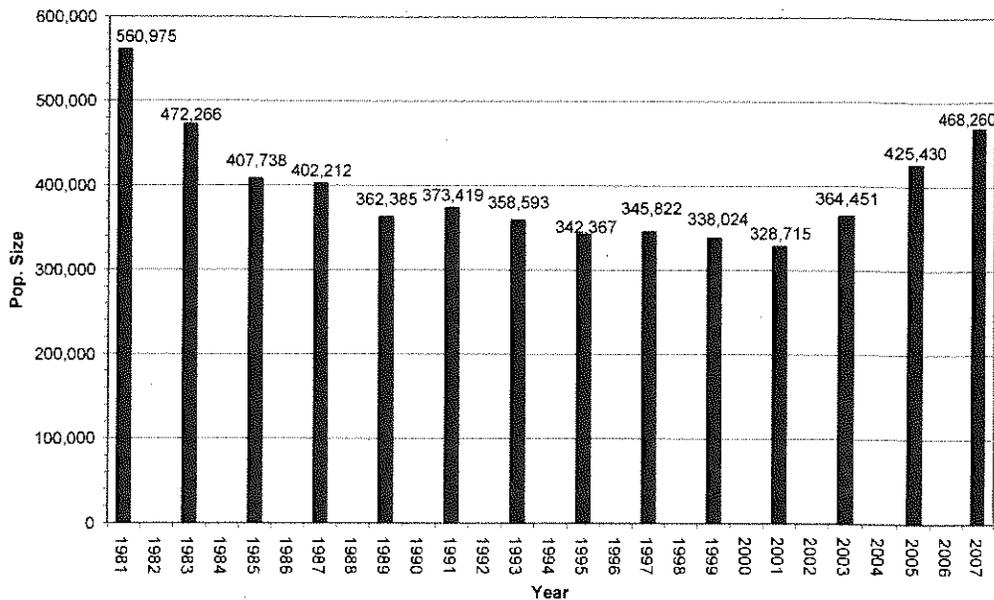


Table 2. Indiana bat population estimates from 1981 – 2007 (USFWS, unpublished data, 2009).



Population estimates for 2007 also showed an increase in total population from 425,430 to 468,260. The 2009 estimates have indicated that the population growth shown in recent years has stopped. The Service is estimating a possible 10% decline in the total population from the 2007 estimates (USFWS 2009). These declines are being attributed to white-nose syndrome (WNS) (see section 2.7).

2.6 Status and Distribution

The current status and distribution of the species is described above. The reasons for listing the species were summarized in the original Recovery Plan as: (1) Hibernating populations in Missouri have shown a decline over the last seven years despite an intensive cave management program; (2) The largest known hibernating population at Pilot Knob Mine, Missouri, continues to be threatened by subsidence (mine collapse); (3) Kentucky hibernating populations are not protected adequately and continue to be depressed (USFWS 1983). Clawson (2002) provided that the hibernating populations in Missouri have continued to decline. Pilot Knob Mine has undergone continued subsidence to the point at which it is unsafe to enter for survey and Kentucky hibernating populations have also continued to decline. The species' range-wide trend is described in Section 2.5 Population Dynamics.

2.7 Reasons for Decline

Not all of the causes of Indiana bat population declines have been determined. Although several known human-related factors have caused declines in the past, they may not solely be responsible for recent declines.

Documented causes of Indiana bat population decline include:

Disturbance and vandalism. A serious cause of Indiana bat decline has been human disturbance of hibernating bats during the decades of the 1960s through the 1980s. Bats enter hibernation with only enough fat reserves to last until spring. When a bat is aroused, as much as 68 days of fat supply is used in a single disturbance (Thomas et al. 1990). Human use (e.g., including recreational cavers and researchers) near hibernating Indiana bats can cause arousal (Humphrey 1978, Thomas 1995, Johnson et al. 1998). If this happens too often, the bats' fat reserves may be exhausted before the species is able to forage in the spring.

Active programs by State and Federal agencies have led to the acquisition and protection of a number of Indiana bat hibernacula. Of 127 caves/mines with populations >100 bats, 54 (43%) are in public ownership or control, and most of the 46 (36%) that are gated or fenced are on public land. Although such conservation efforts have been successful in protecting Indiana bats from human disturbance, they have not been sufficient to reverse the downward trend in many populations.

Improper cave gates and structures. Some hibernacula have been rendered unavailable to Indiana bats by the erection of solid gates in the entrances (Humphrey 1978). Since the 1950s, the exclusion of Indiana bats from caves and changes in air flow are the major cause of loss in Kentucky (an estimated 200,000 bats at three caves) (USFWS 1999). Other cave gates have so modified the climate of hibernacula that Indiana bats were unable to survive the winter because changes in air flow elevated temperatures which caused an increase in metabolic rate and a premature exhaustion of fat reserves (Richter et al. 1993).

Natural hazards. Indiana bats are subject to a number of natural hazards. River flooding in Bat Cave, Mammoth Cave National Park, drowned large numbers of Indiana bats (Hall 1962). Other cases of hibernacula being flooded have been recorded by Hall (1962), DeBlase et al. (1965), and USFWS (1999). A case of internal cave flooding occurred when tree slash and debris (produced by forest clearing to convert the land to pasture) were bulldozed into a sinkhole, blocking the cave's rain water outlet and drowning an estimated 150 Indiana bats (USFWS 1999).

Another hazard exists because Indiana bats hibernate in cool portions of caves that tend to be near entrances, or where cold air is trapped. Some bats may freeze to death during severe winters (Humphrey 1978, Richter et al. 1993). Indiana bats are vulnerable to the effects of severe weather when roosting under exfoliating bark during summer. For example, a maternity colony was displaced when strong winds and hail produced by a thunderstorm stripped the bark from their cottonwood roost and the bats were forced to move to another roost (USFWS 1999).

Suspected causes of Indiana bat decline include:

Microclimate effects. Changes in the microclimates of caves and mines may have contributed more to the decline in population levels of the Indiana bat than previously estimated (Tuttle, in lit. August 4, 1998). Entrances and internal passages essential to air flow may become larger, smaller, or close altogether, with concomitant increases or decreases in air flow. Blockage of entry points, even those too small to be recognized can be extremely important in hibernacula that require chimney-effect air flow to function. As suggested by Richter et al. (1993) and Tuttle (in lit. August 4, 1998), changes in air flow can elevate temperatures which can cause an increase in metabolic rate and a premature exhaustion of fat reserves.

Hibernacula in the southern portions of the Indiana bat's range may be either near the warm edge of the bat's hibernating tolerance or have relatively less stable temperatures. Hibernacula in the North may have passages that become too cold. In the former case, bats may be forced to roost near entrances or floors to find low enough temperatures, thus increasing their vulnerability to freezing or predation. In the North, bats must be able to escape particularly cold temperatures. In both cases, modifications that obstruct air flow or bat movement could adversely impact the species (USFWS 1999).

Land use practices. The Indiana bat's maternity range has changed dramatically since pre-settlement times (Schroeder 1991; Giessman et al. 1986; MacCleery 1992; Nigh et al. 1992). Most of the forest in the upper Midwest has been fragmented, fire has been suppressed, and native prairies have been converted to agricultural crops or to pasture and hay meadows for livestock. Native plant species have been replaced with exotics in large portions of the maternity range, and plant communities have become less diverse than occurred prior to settlement. Additionally, numerous chemicals are applied to these intensely cropped areas. The changes in the landscape and the use of chemicals (McFarland 1998) may have reduced the availability and abundance of the bat's insect forage base.

In the eastern U.S., the area of land covered by forest has been increasing in recent years (MacCleery 1992; Iverson 1994; Crocker et al. 2006). Whether or not this is beneficial to the Indiana bat is unknown. The age, composition, and size class distribution of the woodlands will have a bearing on their suitability as roosting and foraging habitat for the species outside the winter hibernation season.

Chemical contamination. Pesticides have been implicated in the declines of a number of insectivorous bats in North America (Mohr 1972, Reidinger 1972, Reidinger 1976, Clark and Prouty 1976, Clark et al. 1978, Geluso et al. 1976, Clark 1981). The effects of pesticides on Indiana bats have yet to be studied. McFarland (1998) studied two sympatric species, the little brown bat (*Myotis lucifugus*) and the northern long-eared bat (*M. septentrionalis keenii*) as surrogates in northern Missouri and documented depressed levels of acetylcholinesterase, suggesting that bats there may be exposed to sublethal levels of organophosphate and/or carbamate insecticides applied to agricultural crops. McFarland (1998) also demonstrated that bats in northern Missouri are exposed to significant amounts of agricultural chemicals, especially those applied to corn. BHE Environmental, Inc. (1999) collected tissue and guano samples from five species of bats at Fort Leonard Wood, Missouri and documented the exposure of bats to p,p'-DDE, heptachlor epoxide, and dieldrin.

New Threats/White Nose Syndrome. First documented at four sites in New York in the winter of 2006-07 (although recently reviewed photographs of bats at a fifth site in February 2006 point to a likely earlier start), WNS is a probable fungus that is killing cave-dwelling bats in unprecedented numbers in the Northeast. Overall mortality rates (primarily of little brown bats) for 2007 and 2008 ranged from 81% to over 97% at the four study sites. While little brown bats appear to be affected greatest among the six species of cave-wintering bats in the Northeast, Indiana bats have been impacted as well. In addition, species that do not form large clusters in the winter, as little brown bats and Indiana bats do, are not easily counted and we have poor baseline estimates for other species at most sites to compare pre- and post-WNS. Apparent losses of all 685 Indiana bats in Hailes Cave and all but 124 of 13,014 Indiana bats in the

Williams Preserve Mine in New York were documented in the first winter WNS was observed at each site. Surveys conducted at New York's hibernacula during early 2008 estimated the population at 37,141 Indiana bats (a drop of 15,662 bats), which is a 30% decrease from the previous year's estimate for New York hibernacula.

The most obvious symptom of WNS is the presence of a white fungus on the face, wing, or tail membranes of many, but not all affected animals. Behavioral changes are also characteristic of WNS affliction. Service and state biologists in the WNS-affected areas have observed a general shift of animals from traditional winter roosts to colder areas, or to roosts unusually close to hibernacula entrances. There has also been a general lack of responsiveness by affected bats to human activity during hibernation. Animals have been regularly observed flying across the mid-winter landscape, and, on occasions, carcasses of little brown bats by the hundreds to thousands have been found outside affected hibernacula with more found inside. Animals appear to be dying as a result of depleted fat reserves, and mortalities are first apparent months before bats would be expected to emerge from hibernation.

The distribution of WNS appears to be expanding in all directions from its epicenter at hibernacula in western Albany/eastern Schoharie Counties, New York. It has spread in just one year from an affected radius of 9 km in 2007 to an affected radius of at least 200 km in 2008. By the end of the 2008 -2009 winter, WNS has been documented in all of New York's major Indiana bat hibernacula. The loss of 15,662 Indiana bats from the WNS in 2008 represented a loss of approximately 3.3% of the revised 2007 rangewide population. There is no clear evidence of any resistance to the problem among survivors. If current trends of mortalities at affected sites and spread to additional sites continue (and we have no way of knowing if they will, but we have no reason to believe that they will not), WNS threatens to drastically reduce the abundance of most species of hibernating bats in major regions of North America in a remarkably short period of time.

Collisions with man-made objects (e.g., wind turbines, communication towers, and vehicles) are also a potential risk for Indiana bats.

3. Environmental Baseline

The purpose of the environmental baseline is to describe the current status of the species within the action area and those factors that have contributed to this status. Range-wide factors affecting the species include those listed previously under Reasons for Decline. Other factors with the potential to adversely affect roosting habitat include forest clearing within the summer range in Iowa, woodlot management and wetland drainage by landowners, and land management activities by the State of Iowa.

Much of the remaining forested land in the predominately agricultural areas of southeastern Iowa represent potential summer habitat for the Indiana bat. Due to their migratory behavior, Indiana bats likely follow watershed drainage corridors en route to their summer habitats and in returning to their hibernacula. In doing so, they may stop and roost temporarily in suitable floodplain trees, manmade structures such as barns or bridges, or may select an area to spend the summer in a maternity colony. Little definitive information exists regarding the species' maternity habitat selection versus habitat availability.

3.1 Status of the Indiana Bat within the Action Area

The action area includes the entire proposed expansion area (plant expansion and road construction), the wetland mitigation, and forest preservation areas. As described in the BA (McCaslin 2009), the proposed project would directly affect 46.7 acres of the property. Within this construction footprint are 4.7 acres of row crop, 23.9 acres of pasture/open land, 16.0 acres of woodland, 0.8 acres of wooded wetland, and 1.3 acres of existing roads/parking lots.

Four main areas of timber with a total acreage of 63.9 will be affected by the proposed project. These areas were surveyed for the presence of suitable Indiana bat habitat by Howard R. Green Company staff in February of 2006. Suitable habitat was found within three of the four areas. The largest block of timber (site 25 in the habitat survey) is where the majority of the plant expansion will occur and is approximately 44.2 acres in size (McCaslin 2009). This tract is currently bordered by open agricultural fields, pasture, and the existing plant. The habitat survey indicates that this area has a lot of snags. It describes the interior as a mature oak/hickory forest dominated with two major intermittent drainages. The second largest area (23 in the habitat survey) will be affected by the proposed access road and is 10.5 acres in size. This area is currently surrounded mostly by agricultural land but is very close to existing plant operations. The timber is described as having mature oak and hickory trees with some dead wood, containing a drainage along the north edge, and a small farm pond. The third largest area (19 in the habitat survey) is 6.0 acres. It is mostly comprised of early successional cottonwoods and boxelders but does contain some larger trees with loose or flaking bark, and a drainage area. This area is completely surrounded by the current Ajinomoto plant. The smallest area (24 in the habitat survey), which is 3.2 acres in size, was largely made up of young oaks and some osage orange and honey locust along the fence rows. Surveyors did not find suitable habitat in this area for Indiana bats.

Based on the presence of suitable habitat within the project area, a mist netting survey was conducted May 17 - 29, 2006 by Griggs Environmental Strategies (GES). The survey resulted in the capture of 18 bats representing five species, including six female and one male Indiana bats (Griggs 2006). GES surveyed for three nights in accordance with Service guidelines. All of the Indiana bats were found within site 25, the largest forested block. Net locations were chosen to sample the major travel-ways in the sample areas. These travel-ways are most likely being used for foraging (see section 2.3 Diet and Foraging). In addition, because females were captured, it is probable that at least one active maternity colony occurs in the area.

The wintering location of bats using the action area is not known. The action area is over 100 miles away from the closest hibernacula (Blackball Mine, Illinois).

3.2 Factors Affecting the Indiana Bat Environment within the Action Area

Disturbance and vandalism, improper gates at hibernaculae, natural hazards, microclimate changes, land use in the maternity range, and contaminants were discussed in Status of the Species preceding. The long-term maintenance of suitable summer habitat on private land is questionable throughout the agricultural Midwest, as commodity markets drive conversion of land cover types from forest to cropland, and under some conditions as noted by Crocker et al. (2006), back to forest. Elsewhere, urbanization of agricultural lands results in the conversion of rural landscapes consisting of mixed forest, shrub-scrub, grassland, crop, and stream cover types

to suburban landscapes consisting of lawn grass, domestic plantings, homes, paving, and associated infrastructure. Survey efforts are infrequent, and despite the apparent abundance of seemingly suitable habitat in the upper Midwest, definitive evidence of habitat occupation is limited.

Although forest clearing will occur during winter months, destruction of multiple roost trees in a small area can greatly increase the thermoregulatory costs for individuals returning to familiar sites and could potentially disrupt the social bonds of a colony (Kurta and Murray 2002). It is not known if primary or alternate maternity roost trees will be removed in this area. Given the maternity site fidelity noted in Life History, preceding, female Indiana bats returning to the action area in the spring following tree removal would have to disperse to alternative roost trees on or near the action area. Because this is a long-lived and highly philopatric species, individuals would be expected to attempt to maintain colony cohesion as close to familiar maternal habitat as possible. Therefore, protection and enhancement of the remaining habitat would be expected to contribute to colony cohesion and successful recruitment for the species.

4. Effects of the Action

This section includes an analysis of the direct and indirect effects of the proposed action on the species and/or its critical habitat and its interrelated and interdependent activities.

4.1 Tree Removal and Project Construction

The applicant proposes to clear 16.0 acres of forested habitat from the action area which contains two major intermittent drainage areas. The proposal will require the conversion of 1,180 linear feet of wooded intermittent stream channel to a culverted system.

The largest forested tract with the most suitable habitat within the action area will be the most affected by the project. Approximately 10.4 acres of the existing 44.2 acre area will be permanently removed for plant expansion. Additionally, 1,180 feet of the intermittent drainage within this area will be converted to a culverted system. This area is where all of the Indiana bats were collected during the 2006 mist netting survey (Griggs 2006).

The effect of these actions will be loss of primary and secondary roost trees, modification of roost and associated foraging area characteristics such as canopy density, solar exposure, and foraging cover. The permanent conversion of this habitat due to the new plant expansion will eliminate the long term opportunities for regaining foraging habitat along the tributary corridor, and development of new roost sites within the upland.

The likely behavioral response of bats returning to the action area will be to disperse to adjacent upland suitable habitat. Because four other species of bats were captured in the action area, the potential for increased competition following permanent removal of roost trees and conversion of foraging habitat exists. Resource partitioning among foraging bats, including the Indiana bat, suggests such competition (LaVal et al. 1977), (Lee 1993), (Butchkoski and Turner 2005). Long distance migration and pregnancy following a six to seven month hibernation period exacts an energetic toll.

Therefore, any additional energy demands from searching for new roost trees could potentially

result in slower prenatal development or abortion, delayed parturition, slower postnatal development, delayed weaning and volancy, and increased juvenile predation risk. For both females and males, the effects from removal of roost trees and converting foraging habitat may include increased energetic demands, exposure to inter and intra-specific competition, and exposure to predation while searching for new roosting and foraging areas. Destruction of multiple roost trees in a small area can greatly increase the thermoregulatory costs for individuals returning to familiar sites and could potentially disrupt the social bonds of a colony (Kurta and Murray 2002). Conservation measures are expected to mitigate these effects.

Because this is a long-lived and highly philopatric species, individuals would be expected to attempt to maintain colony cohesion as close to familiar maternal habitat as possible. Therefore, protection and enhancement of remaining habitat would be expected to contribute to colony cohesion and successful recruitment for the species. Implementation of conservation measures may help stabilize remaining Indiana bat habitat and help stabilize the colony in the future.

The applicant has offered several conservation measures which may be employed to help minimize the impacts to Indiana bat summer habitat (McCaslin 2009). As is stated in the conservation measures, all tree removal will be during the non-maternity period from September 16 - April 14 so that there will be no expected direct take of individuals. The original proposed plant expansion design included removal of 26.75 acres of forested habitat and alteration of 3,578 linear feet of intermittent stream channel. These plans have been changed significantly to reduce adverse effects. AHL will install erosion control measures to prevent siltation and degradation to wildlife habitat areas. Also, to help compensate for the loss of 16 acres of suitable Indiana bat habitat, the applicant is proposing to plant 4.2 acres of trees and preserve 19.5 acres of trees within the same watershed (McCaslin 2009). Although the proposed mitigation areas are very close to the action area, there is no proposed protection for the remaining 33.8 block of timber remaining after plant expansion. The plant expansion as proposed would accommodate production for the next 20 years. Thus, we do not expect additional clearing directly adjacent to the plant in the near future.

Conservation measures to minimize harm to listed species which are proposed by the applicant and action agency are also considered part of the proposed project and their implementation is required under the terms of the consultation. Implementation of the proposed mitigation plan via reforestation, and re-meandering and enhancement of an existing stream channel will partially offset a portion of habitat loss and may help colony members bridge short term effects of habitat conversion to reestablish their colony elsewhere, if needed.

The proposed conservation measures are anticipated to minimize the level of impact such that neither reproductive success nor survival will be appreciably affected. First, the proposed conservation measures include restricting clearing activities to periods when bats are not likely to be using the area. This will reduce nearly all direct exposure to mortality from project impacts. Second, the remaining habitat directly adjacent to the plant expansion contains suitable roosting and foraging habitat. The Indiana bat habitat survey of the area surrounding action area showed there is approximately 205.2 acres of forest within a 0.5 mile radius. These areas include potential foraging and roosting habitat. A 2009 mist netting survey conducted by Cargill along Miller Creek found 3 Indiana bats utilizing this foraging habitat. This area is within 1 mile of the AHL project site.

4.2 Interrelated and Interdependent Actions

Effects of the action are analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under construction.

The action under consultation is the expansion of the existing facility and the addition of a new facility road. The plant expansion is being designed to accommodate production for the next 20 years (McCaslin 2009), and so we do not anticipate additional plant expansion in the near future.

4.3 Indirect Effects

Indirect effects may include other Federal activities that have not undergone Section 7 consultation and non-Federal actions that might reasonably be expected to occur in the future as a result of the subject action.

There are currently plans being developed to expand the Cargill plant directly south of the AHL action area. This proposed industrial development may benefit from the new AHL access road and is expected to eventually border the remaining 33.8 block of timber on two of the remaining three sides. Ongoing informal consultation with this office indicates that the proposed Cargill development area does not contain much suitable Indiana bat habitat, that development will happen incrementally, and project mitigation plans include the enhancement and preservation of some larger blocks of suitable habitat along Miller Creek as part of their 404 mitigation plan.

5. Summary

As described in the BA (McCaslin 2009), the action area includes 63.9 acres of wooded habitat. Six female and one male Indiana bats were found within this forested habitat during a 2006 mist netting survey indicating the action area most likely provides foraging and roosting habitat.

The proposed project would require the clearing of 16.0 acres of forested habitat and the conversion of 1,180 linear feet of stream channel to a culverted system. Tree clearing will be during the non-maternity period between September 16 and April 14 to avoid direct take of individual bats. Potential impacts of project authorization on Indiana bats involve displacement from summer habitat within the plant expansion and road construction areas.

The displacement includes harm and harassment to adult male and female bats from increased energy demands from searching for and establishing new territories, increased inter and intraspecific competition, and increased exposure to predation.

Approximately 189.2 acres of woodland will remain within a 0.5 mile radius of the action area after construction of the expanded AHL facilities and the access road. Based on the description of this habitat, we believe it will provide suitable roosting and foraging habitat for returning bats. Although some of the 189.2 acres of timber will likely be removed during successive development at the nearby Cargill plant, this development will likely occur over many years allowing for dispersal of bats into the surrounding habitat. While the loss of familiar roost trees may cause short term physiological responses, it is not expected to have long term consequences

for the colony.

No direct effects on hibernacula or designated critical habitat are foreseen from implementation of the recommended plan.

6. 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. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

The Service is unaware of any other non-Federal actions that are reasonably certain to occur which may affect the Indiana bat in the action area. However, similar actions to those described, such as the Cargill Plant expansion will require authorization under Section 404 of the Clean Water Act. Given appropriate environmental and endangered species coordination in the Section 404 review process, impacts to the Indiana bat can be avoided. Therefore, any residual cumulative effects due to non-Federal actions are considered to be negligible.

7. Conclusion

After reviewing the current status of the Indiana bat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's opinion that the proposed action is not likely to jeopardize the continued existence of the Indiana bat, and is not likely to destroy or adversely modify designated critical habitat.

The proposed project will not affect hibernating activities or habitat. Authorization of the proposed project, however, presents the potential to affect summer habitat for both female and male Indiana bats, adults, and juveniles. Although we expect adverse impacts to be minimized by the conservation measures proposed, it is likely that adverse impacts to the individuals of the species cannot be avoided entirely, and take will occur. Potential impacts to Indiana bat habitat include removal of primary and secondary roost trees and loss of foraging habitat. Based on the preceding analysis of the quality and percentage of total forested habitat affected, conservation measures proposed by the action agency, and the timeline of the proposed action, it is expected that adverse impacts to Indiana bats will be minimized but not avoided entirely, due to the unknown distribution of roosting bats on the action area. Though impacts to individuals will occur, we do not anticipate colony-level consequences. Although the colony may disperse when returning in the spring, we feel there will remain adequate roosting and foraging habitat within the action area and in close proximity to the action area to support the colony. Therefore, we do not anticipate any appreciable reduction in reproduction, numbers, or distribution of Indiana bats within the action area or rangewide. The action area is geographically distant from designated critical habitat, thus authorization of the proposed project does not affect critical habitat and no destruction or adverse modification of that critical habitat is expected.

8. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA, prohibits the take of endangered and threatened species without special exemption. Take is defined as, to

harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or 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 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 behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the Applicant, Ajinomoto Heartland, LLC, for the exemption of Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Corps: (1) fails to assume and implement the terms and conditions; or (2) fails to require the Applicant to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement, pursuant to 50 CFR § 402.14(i)(3).

8.1 Extent of Take Anticipated

Incidental take of Indiana bats is expected to be in the form of harm and harassment. Based on the conservation measure of removal of trees outside the maternity colony dates of April 15 – September 15, we do not anticipate any direct take of Indiana bats to occur and that incidental take relative to maternal bats will occur in the form of harm and harassment from habitat loss as the proposed action will alter roosting and foraging habitat characteristics within suitable maternity habitat.

This incidental take statement is based on a maximum of 16 acres of habitat foregone in the expansion of the AHL plant and the construction of the new access road. We anticipate that incidental take of Indiana bats will be difficult to detect within the project because: (1) dead or injured bats are rarely discovered due to the bat's small body size; and (2) the number of bats occupying a particular area at a particular time is highly variable and difficult to determine. Since the level of incidental take of Indiana bats resulting from non-lethal harm and harassment cannot be adequately quantified, incidental take will be estimated by the loss of roost trees potentially occupied by Indiana bats that are contained within the forested habitat estimated to be affected. These estimates of habitat alterations are described in the Effects of the Action (Section 4) Summary preceding.

In order to monitor the level of take, we recommend monitoring bat use of the action area. Such monitoring will allow determination of the efficacy of the Conservation Measures described previously. If the conservation measures perform as expected, we do not believe incidental take will rise to the level of affecting the long term reproductive success or viability of the colony using the action area. Monitoring should begin the summer after the trees are removed to

determine whether displaced bats are utilizing remaining habitat within the action area. Monitoring should include a mist netting survey within the action area followed by a search for maternity roosts using radiotelemetry.

While the conservation measures proposed by the applicant will conserve and enhance some habitat suitability, actual habitat utilization of these areas remains to be determined until implementation of the terms and conditions that follow.

Management activities on the action area that prevent enactment of the conservation measures and/or would significantly increase the number of trees removed during the non-hibernation season, would be considered to affect this determination, and would require reinitiation of consultation. Such activities, should they occur, will be documented in monitoring reports described subsequently.

8.2 Effect of the Take

In the accompanying BO, the Service determines that this level of expected take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

8.3 Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the Indiana bat.

The amount and effect of take associated with the clearing of suitable Indiana bat summer habitat within the AHL action area is based on the applicants stated conservation measures. It is expected that the timber remaining in the action area will continue to provide habitat to returning Indiana bats and reduce any adverse effects to the maternity colony. Surveys of this remaining area will be needed to evaluate the effectiveness of the conservation measures and the expected take.

9. Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the Corps must comply with the following terms and conditions. These terms and conditions are non-discretionary.

1. Monitor clearing and construction of the project including review of clearing dates and acreages to ensure that they are outside of the Indiana bat maternity period (April 15 – September 15) and they are consistent with the acreages in the BO.
2. Monitor Indiana bat use of the action area beginning the summer following completion of the plant expansion and then again in 3 years. Each monitoring event should include a mist netting survey following the Service guidance. Prior to each monitoring event, field work will be coordinated with the Service's Rock Island Field Office (309) 757-5800.
3. If site investigations or monitoring activities indicate that a maternity colony persists within the action area, roost areas used by the maternity colony(ies) will be identified using radiotelemetry.

9.1 Requirements for Monitoring and Reporting of Incidental Take of Indiana Bats

Federal agencies have a continuing duty to monitor the impacts of incidental take resulting from their activities (50 CFR 402.14(i)(3)). In doing so, the Federal agency must report the progress of the action and its impact on the species to the Service as specified below.

Supply the Service with a reports, due by December 31 on the first and fourth year following project completion that specifies progress and results of any terms and conditions that were required, identified by site-specific project, including the number of live or dead Indiana bats encountered, and age, sex, and reproductive status of live bats handled, and location and number of maternity colonies, if found.

Care must be taken in handling dead bat specimens that are found on project lands to preserve biological material in the best possible condition. Any dead specimens found should be placed in plastic bags and refrigerated as soon as possible following discovery. The finding of any dead specimen should be reported immediately to the Service's Rock Island Field Office (309) 757 - 5800.

CLOSING

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the monitoring period, the level of incidental take described above 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 the reasonable and prudent measures. For the purpose of this BO, the incidental take would be exceeded when the impacts to forest resources exceeds the aggregate 16 acres for plant expansion and road construction; and/or the actions described in Conservation Measures preceding are not carried out as described.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the recommended plan provided in Public Notice CEMVR-OD-P-2006-1369 and attendant documents for the AHL plant expansion in Monroe County Iowa. The subject Public Notice was dated March 5, 2009, and the BA dated April 2009, was received May 27, 2009. 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 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.

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