

**Supplemental Information  
to the  
Programmatic Biological Assessment  
for the  
Revised Land and Resource Management Plan  
Daniel Boone National Forest**

**Effects on the Indiana Bat Related to  
Salvage and Sanitation Timber Sales on the  
Daniel Boone National Forest**

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## **I. Proposed Action**

### **Management Actions Associated with Salvage or Sanitation Timber Harvest Activities**

Stochastic events can bring about unplanned alterations of the forest overstory. In the past, these events have usually been related to wind and/or ice/snow storms, insect and disease outbreaks, and wild fire. While the nature and occurrence of a stochastic event is unplanned, management actions can occur in response to the forest conditions brought about by these events.

The DBNF has experienced stochastic events across the forest totaling an average of approximately 700 acres annually. This estimate is based on a 10-year average for actual occurrences on the DBNF (Draft Revised Forest Plan EIS, Chapter 3 under Vegetation Cover). This estimate does not include, nor is it intended to, large-scale events such as the southern pine beetle epidemic. Large-scale events will be analyzed separately and are not part of this programmatic document. In response to the tree damage brought about by these random stochastic events, managers have proposed salvage or sanitation harvests on roughly half of the 700 acres each year. It seems reasonable to assume that the current trend, with regard to stochastic events, will continue in both the incidence of and the need for management action on these forest acreages. Thus, the DBNF will likely initiate salvage or sanitation timber sales on up to 350 acres annually. It is realized that this level of harvest may not occur every year.

Salvage or sanitation timber sale projects are very similar to the actions described for green tree timber sale actions. Specifically, salvage or sanitation timber sale projects will consist of the potential following actions; administration, felling, skidding, decking, loading, and hauling of timber products from the sale area. These actions are essentially the same as the actions associated with green tree cutting and are further delineated in that Supplemental BA.

Programmatic management actions associated with salvage/sanitation projects are similar to green tree harvest actions. There are few similarities between “typical” salvage/sanitation harvests. All are a result of management action taken in response to unplanned stochastic events. However, all Forest Plan standards, unless specifically exempted in the standard itself, still apply to harvest actions associated with these projects. Thus, all standards associated with the Indiana bat would still apply except for two that are specifically exempted. In salvage/sanitation harvests it is the dead trees (snags) or damaged trees (immediate roost trees) that are the focus of the harvest. These exempted standards are DB-WLD-1 and DB-WLD-7.

Another Forest Plan standard that is programmatically exempted from salvage/sanitation harvests is the 40-acre size limit on cutting units (DB-VEG-22). Thus, cutting units can exceed this upper limit established for green tree harvest units. Because of the unplanned, (stochastic) nature of the action that initiates the need for salvage/sanitation harvests, the size of the actual cutting units can vary greatly. Small units can occur with just a few

trees removed from an area as small as an acre. Large units, over 40 acres can occur as a result of a more widespread event. A review of the Continuous Inventory of Stand Conditions<sup>1</sup>(CISC) over the last 40 years indicates that a total of 93 salvage/sanitation cutting units occurred during that time period. The average size of these cutting units was 23 acres. The cutting unit size ranged from 2 to 100 acres. The average size of a cutting unit is likely to remain about the same during the next planning period.

The actual appearance of a completed salvage/sanitation sale is difficult to characterize. Extensive tree damage that results with essentially all the trees being blown down in an area would have little left standing after project completion. At the other end of the scale, the removal of just a few trees from an area would result in little or no change in forest appearance or function.

## **II. Forest-wide Programmatic Effects of Salvage/Sanitation Timber Sales**

The specific actions associated with salvage/sanitation timber harvest projects have been outlined in the green tree section of that supplemental BA. Actions specifically associated with the felling of 350 acres of damaged or dead trees and other possible actions connected thereto, are appropriate to be considered at this programmatic, Forest Plan level for the Indiana bat.

The major difference between green tree timber sales and those associated with salvage/sanitation operations is in the condition of the individual trees that are selected for removal. In these timber sales, it is the highly damaged trees that are selected for removal and, thus make up the majority of trees cut in a project area.

These damaged trees usually meet the physical condition of what have been defined in the Revised Forest Plan as “immediate roost trees” for the Indiana bat.

*Immediate roost trees - In Indiana bat management, a live tree of any DBH, having one or more characteristics that make it immediately available for Indiana bat roosting. Characteristics include sloughing bark, or cavities with openings to the outside, e.g., large splits or cracks in the bole, large broken limbs, or lightning scars.*

Thus, salvage/sanitation harvest projects usually are designed to remove the specific trees identified as desirable roosting sites for the Indiana bat. The Revised Forest Plan contains a standard that specifically retains these immediate roost trees within project areas involving green tree timber harvest.

*DB-WLD-7. During implementation of vegetation management, retain any immediate roost trees (Indiana bat) that are equal to or greater than 6 inches dbh. These*

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<sup>1</sup> A computerized database used by the Southern Region, USDA Forest Service, to store and retrieve timber stand attributes, scheduled activities, and accomplished activities.

*trees must be designated prior to project implementation. This standard does not apply to salvage or sanitation projects.*

If the stochastic event is severe enough or if enough time passes prior to management action, the resulting trees within the project area may be dead (snags). These trees have also been recognized as potentially having characteristics that make them desirable for Indiana bat roosting. The Revised Forest Plan contains another standard that specifically retains these snags within project areas involving green tree harvest.

*DB-WLD- 1. No snags equal to or greater than six inches in diameter at breast height (dbh) and equal to or greater than 10 feet in height are to be intentionally felled within timber harvest, regeneration and thinning projects, unless identified as an immediate threat to human safety. This standard does not apply to salvage or sanitation projects.*

However, as noted in DB-WLD-1 and DB-WLD-7 above, these standards do not apply to salvage or sanitation projects.

### **III. Analysis of Effects of Interdependent and Interrelated Actions Associated with Salvage/Sanitation Timber Harvest on the Indiana Bat**

#### **Direct and Indirect Effects**

During the non-hibernation season Indiana bats, especially females, often roost in trees with damaged limbs or tops and/or dead trees with naturally exfoliating bark. It is the physical condition of the tree, rather than the tree species itself, that makes these trees suitable roosting habitat for the Indiana bat. Stochastic events, in part, distribute trees in this condition across the forest. When these stands are selected for harvest operations, programmatically, the following effects can be expected for the Indiana bat.

#### Timber Appraisal, Advertisement, Bidding, Award Of Sale and Closing the Sale

These associated activities are administrative in nature and would have no direct or indirect effect on Indiana bats.

#### Sale Area Layout/Designation of Timber to be Harvested

No direct effects are anticipated. However, taking measurements with a diameter tape and/or testing for soundness with a hand ax may indirectly disturb a roosting Indiana bat, thus, changing its normal behavioral pattern. Roosting Indiana bats can be flushed from trees within a salvage/sanitation cutting unit. The noise associated with human presence in the area can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to male or female Indiana bats roosting in trees in the area.

### Felling

Regardless of the felling method used, either through dropping or accidental damage to an adjacent tree, the direct effects to the Indiana bat are the same. Assuming the bat remained in the tree, it could be harmed or killed when the tree strikes the ground. While male bats can fly away from a tree during the felling process, females seem much less likely to leave if they have flightless young present. Flightless young in a maternity colony would not have the opportunity to leave their roost tree and would likely be killed. Once the young bats become volant their likelihood of surviving the felling of a tree in which they are roosting increases substantially. Project level monitoring on the DBNF indicates that there is no known occurrence of Indiana bat mortality associated with the felling of trees.

Indirect effects are the same, regardless of the felling method used; disturbing a roosting Indiana bat may alter its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the chain saw operation. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat due to the low probability that a tree containing one or more Indiana bats would be felled.

### Skidding

Regardless of the skidding method used, the direct affects to the Indiana bat are the same; it could result in take of an Indiana bat that survived the felling operation and remained in the log. The skidder and/or trailing log may also accidentally knock down a non-target tree that may take an Indiana bat.

Indirect effects are in the form of disturbance; disturbing a roosting Indiana bat may change its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the running of skidders. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

### Decking/Landing

Regardless of the number, location and size of the decking/landing areas, the direct effects to the Indiana bat are the same –take may occur when the area is cleared, logs are skidded, and/or loaded onto a transport truck.

Because of concentrated activities, indirect effects in the form of disturbance may be initially greater around decks and landing. As stated previously, disturbing a roosting Indiana bat may modify its normal behavioral pattern. The noise or disturbance is

generated by a variety of activities ranging from human presence in the area to the loud noises associated with the running of loading equipment and log trucks. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

#### Transporting Logs

Regardless of the number, location, distance, and standard of temporary roads, the direct effects to the Indiana bat are the same – take may occur when trees are felled during road construction.

Indirectly, the movement and noise of trucks may disturb a roosting Indiana bat, thus altering its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the log trucks. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

During the planned felling of damaged or dead trees in salvage/sanitation harvests, two other incidental actions could occur resulting in negative effects to Indiana bats. The wrong trees could be cut or the selected tree could, in the process of falling, accidentally knock down a tree that was not intended for felling. The DBNF has documented this accidental felling for the last four years. The actual number of trees that have been accidentally felled incidental to the logging operations are low and have been provided in the BA supplement for green tree cutting. Inspection of these trees has determined that no known take of an Indiana bat has occurred.

During the removal operations (skidding, decking, and transporting) of trees from the salvage/sanitation project area, other trees may be accidentally knocked down. For example, trees not designated for removal as part of a planned action could be accidentally knocked over by skidders or other logging equipment operating in the area. During the last four years (2000 - 2003) monitoring data indicates that between 1 and 17 trees are accidentally felled on an annual basis. Reportable roost trees are defined in the green trees supplemental BA as well as in the Revised Forest Plan. These accidents could result in direct and/or indirect effects resulting in harm, harassment or mortality to Indiana bats utilizing these trees as roosting habitat.

The Forest Plan contains no programmatic prohibitions prohibiting salvage/sanitation harvest of damaged or dead trees between 1 April and 15 September, thus programmatically, this action may directly and/or indirectly impact the Indiana bat on up to 350 acres of anticipated annual tree felling activity. Most standing trees selected for harvest in this type of sale generally provide suitable roosting habitat for the Indiana bat.

While the probability of taking an individual Indiana bat remains low, it is likely to be somewhat higher, at least on a per acre basis, than that which occurs on 4,000 acres of green tree cutting activities. Overall, the DBNF has no known occurrence of taking an Indiana bat during tree felling or associated operations.

With the exception of DB-WLD-1 and DB-WLD-7, other Revised Forest Plan standards (DB-WLD-2, 3, 4, 5, 8, 11, 12) designed to protect the Indiana bat or enhance its habitat remain in affect during salvage/sanitation project implementation. Thus, suitable roosting habitat is retained within the salvage/sanitation project areas and remains generally abundant across the general forest area. Roosting habitat is not considered to be a limiting factor for the Indiana bat on the DBNF.

### **Cumulative Effects to the Indiana Bat**

Cumulative effects are those effects of future State, local, or private actions that are reasonably certain to occur within the action area of the DBNF. This programmatic BA addresses only those activities that are authorized by the Revised Forest Plan on lands that are under the jurisdiction of the U.S.D.A. Forest Service. Thus, any future State, local, or private actions that could potentially occur on the DBNF would require a permit from the Forest Service and will require compliance with the consultation provisions of Section 7 of the ESA as a second level, site-specific analysis of an individual project. There are no State, local or private actions reasonably certain to occur as a result of salvage/sanitation tree harvest projects. Therefore, cumulative effects, as defined by the ESA, will not occur.

### **Interrelated and Interdependent Effects on the Indiana Bat**

Activities associated with projects designed to remove damaged or dead trees in salvage/sanitation harvests are listed in the first section of this supplement. The likelihood of any or all of these actions being used depends on the site-specific conditions and needs associated with a specific project. Individual Indiana bats have been found roosting in trees within active timber harvest projects (MacGregor, personal communication). Thus, even active sales, with all kinds of potential disturbance activities, still serve as suitable roosting habitat for the Indiana bat. From a project level, site-specific standpoint actions other than the felling of damaged or dead trees can be designed into a project in such a way so that the Indiana bat is not negatively affected by the project action that likely would lead to a resulting determination of not likely to adversely affect.

Beneficial indirect effects associated with salvage/sanitation harvest activities may also occur. In the short term, the increased sunlight exposure on residual trees resulting from tree removal may improve microclimate conditions for roosting Indiana bats. Sun exposure on suitable roosting trees results in warmer roosting conditions. This is thought to be especially important for maternity colonies (MacGregor, personal communication). Salvage/sanitation harvests occur when stochastic events cause unplanned disturbances in the forest overstory. In the long term, salvage/sanitation timber harvest activities are

designed to move the habitat of a prescription area toward its desired future condition. A discussion of the desired future condition for each prescription area on the DBNF can be found in the Revised Forest Plan. Desired future conditions are designed, in part, to maintain or enhance conditions relating to species viability. For the Indiana bat these conditions would generally include older, more open forest stands interspersed with other stands in various, younger, age classes. Overall forest conditions will range from open forest with sparse overstory of large, broad-crowned trees, to closed forest, to dense thickets of young regeneration. This mosaic of habitat conditions and age classes will continue to provide suitable roosting and foraging habitat for the Indiana bat.

Specifically to the Indiana bat, the Forest Plan provides standards to protect, maintain and/or enhance Indiana bat habitat associated with timber sale projects, including salvage/sanitation harvests. Specific standards that apply to salvage/sanitation projects appear below:

*DB-WLF-2. Retain or create at least three snags per acre equal to or greater than 9 inches dbh within all timber harvest, regeneration, sanitation, salvage, or thinning project units when available.*

*DB-WLF-3. Retain enough live trees to provide partial shading of about one-third of all snags equal to or greater than 12 inches dbh and equal to or greater than 10 feet in height that are suitable for roosting by Indiana bats.*

*DB-WLF-4. In the two-aged shelterwood method, retain a minimum of 10 to 15 square feet of basal area per acre (average in stand) of live potential roost trees (Indiana bat).*

*DB-WLF-5. In harvest units equal to or greater than 10 acres that prescribe the two-age or even-age systems, leave some clumps or strips averaging at least 50 square feet of basal area (of trees equal to or greater than 9 inch dbh) per acre, or the density of the original stand if less. "Leave areas" such as the Cliffline Community and Riparian Corridor Prescription Areas can provide this habitat based on site-specific conditions.*

*DB-WLF-8. Tree cutting may not be conducted within 2.5 miles of any Indiana bat maternity colony between May 1 and August 15.*

*DB-WLF-11. Timber harvest will not occur on the DBNF within one mile of a known significant bat caves, or PETS bat staging cave (with the exception of the wooded grassland/shrubland habitat association), if this activity would result in more than 120 acres of forest less than 10 years of age on all ownerships (public and private).*

*DB-WLF-12. Within five miles of a significant Indiana bat hibernaculum, tree cutting is not to be conducted between September 1 and December 1.*

As a result of salvage/sanitation tree harvest activities, the overall habitat modification is not likely to directly and/or indirectly affect the availability of suitable Indiana bat



roosting habitat on the DBNF. Over 95 percent of the DBNF acreage (663,682/693,726) is forested habitat (Draft Revised Forest Plan EIS) and is considered to have trees suitable for Indiana bat roosting. Further, within tree harvest areas many of the individual trees that exhibit the most favorable characteristics for roosting (maintain a minimum of three snags/acre, partial shading of 1/3 of the retained snags, and 10-15 basal area/acre of potential roost trees in two-aged shelterwoods,) (DB\_WLF 2, 3, and 4) are to be retained within timber harvest areas. Revised Forest Plan Standards are designed to minimize the potential of direct and indirect negative effects to Indiana bats. The removal of up to 350 acres of trees during salvage/sanitation harvests should not have a detrimental affect on the overall availability of suitable trees in which Indiana bats can roost. Abundant roosting habitat would remain on the forest and within the sale area thus, it is anticipated that roosting habitat will not be limiting to Indiana bat populations, in the short-term or long-term, on the DBNF.

During salvage/sanitation tree cutting operations trees with conditions suitable for Indiana bat roosting will be felled on up to 350 acres/year on the DBNF resulting in possible adverse affects to the Indiana bat. Within the project area, some suitable roosting trees are retained so that the overall potential to harm an Indiana bat remains very small and the suitability of the area as roosting habitat is retained. Indirectly, the cutting of trees during salvage/sanitation operations may result in the accidental felling of trees not selected for removal. Some of these trees are likely to be suitable for Indiana bat roosting. Monitoring indicates that the number of incidentally felled, suitable roost trees, is very small ranging from 1 to 17 per year during the last four years.

#### **IV. Determination of Effects for the Indiana Bat**

In the long-term, the implementation of the Revised Forest Plan should result in improved habitat conditions for the Indiana bat through the attainment of prescription area desired future conditions. Indiana bats may be inadvertently flushed from their roosting trees by activities associated with salvage/sanitation tree cutting activities. The probability of negatively impacting these bats, although very small, does exist as previously discussed in the analysis section.

However, the potential remains, although it is very low, for Indiana bats to be harmed by the direct and indirect effects of cutting dead or damaged trees and other associated actions. From a programmatic standpoint this activity may occur on as much as 350 acres annually on the DBNF. Central to the tree felling activities associated with salvage/sanitation harvests is the knowledge that the trees selected for harvest also represent those that Indiana bats are likely to find most suitable for roosting. These trees can either be felled intentionally as part of the specific project or can be felled incidentally as accidents resulting from the proposed action. Therefore, the determination of effect for salvage/sanitation harvest is **“likely to adversely affect”** the Indiana bat.

These programmatic determinations of effect, at the Forest Plan level, in no way preclude the requirement for second level, site specific analysis and consultation with the USFWS on individual projects proposed under the general direction of the Forest Plan.

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