

## **Appendix F**

### **BAT CONSERVATION AREA COMPENSATORY MITIGATION PLAN**

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**Sunoco Pipeline L.P.  
Pennsylvania Pipeline Project  
Raystown Lake Recreation Area  
Bat Conservation Area No. 2  
Compensatory Mitigation Plan**

Prepared for:

U.S. Army Corps of Engineers  
Baltimore District

Prepared by:

Tetra Tech, Inc.  
301 Ellicott Street  
Buffalo, NY 14203

May 2016

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## APPENDICES:

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Appendix A: Artificial Roost Structure/Tree Girdling Information

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## 1 BACKGROUND/BASELINE INFORMATION

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Sunoco Pipeline L.P. (SPLP) has prepared this Bat Conservation Area (BCA) Compensatory Mitigation Plan (Plan) to mitigate for the 1.4 acres of potential impact associated with the proposed Pennsylvania Pipeline Project (Project) to a designated BCA at the U.S. Army Corps of Engineers (USACE) owned/administered Raystown Lake Recreation Area in Huntingdon County, Pennsylvania. USACE Raystown Lake established the BCA in August 2015 as part of a programmatic agreement with the U.S. Fish and Wildlife Service (USFWS) to address permanent operations and maintenance activities at Raystown Lake, and to avoid/minimize potential impacts to the Indiana Bat (*Myotis sodalis*) and the northern long-eared bat (*M. septentrionalis*), and other forest dwelling bat species (e.g., eastern small-footed bat [*M. leibii*], little brown bat [*M. lucifugus*], and tri-colored bat [*Perimyotis subflavus*]). Three (3) BCAs totaling 2,492 acres were designated at Raystown Lake to protect bat roosting and foraging habitat from permanent loss associated with current and future activities/projects at Raystown Lake. In January 2016, the USACE prepared the BCA Compensatory Mitigation Requirements for the Raystown Lake (USACE 2016), and the USFWS subsequently issued their biological opinion supporting the establishment of the BCAs in February 2016.

The Project would traverse BCA No. 2, an area measuring approximately 1,105 acres designated for bat conservation habitat. Despite avoidance and minimization measures SPLP has implemented for the Project (primarily minimizing construction workspace to 75-foot wide, and to 50-foot wide at wetlands and streams), Project construction would occur through approximately 2.2 acres of the 1,105-acre BCA No. 2. The Project would require clearing approximately 1.4 acres of forested habitat in this BCA.

Tetra Tech contracted Apogee Environmental to conduct surveys for bat roost trees within and adjacent to the proposed Project workspace on USACE properties. These surveys included the forested areas and land within BCA No. 2, where surveyors searched for snags and trees  $\geq 3$  or  $\geq 5$  inches in diameter at breast height (DBH) that met USFWS criteria for potential summer roosting and foraging habitat for the Indiana bat ( $\geq 5$ ) and northern long-eared bat ( $\geq 3$ ). Based on these surveys, no potential bat roost trees were identified within the proposed Project workspace in BCA No. 2 (Apogee 2015).

## 2 GOALS AND OBJECTIVES

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SPLP's primary goal and objective for this Plan is to compensate for bat habitat loss that will occur as a result of tree clearing for the Project within BCA No. 2 (Figure 1). This will include the implementation of the following compensatory mitigation practices (at a mitigation ratio of 2:1 as defined in Section 3):

1. installation of artificial roost trees (to provide immediate replacement of roosting habitat);
2. girdling of trees (to create more natural roosting habitat in the future); and,
3. invasive species control (to prevent habitat degradation for species currently present).

### 3 RATIO/CURRENT VALUE

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Section 17-5 of the USACE Engineering Circular (EC) 1130-2-550 indicates that “wherever possible, applicants requesting use of Corps fee-owned lands or waters generally will be required to mitigate for adverse impacts to ensure that public resources suffer no net loss of value, post-construction.” As part of development of their BCA Compensatory Mitigation Requirements for the Raystown Lake, the USACE established compensatory mitigation requirements to go above and beyond a one-to-one replacement with a minimum mitigation ratio of 2:1 at the Raystown Lake for BCAs with no previous mitigation efforts or voluntary enhancements. The value of compensatory mitigation is based on Pennsylvania’s average value of farm real estate as published annually by the U.S. Department of Agriculture in the Land Values and Cash Rents document. At the time of preparation of this Plan, the average value of farm real estate was published at \$5,500 per acre for Pennsylvania.<sup>1</sup>

Project impacts were determined in consideration of the total acreage of the construction limits of disturbance (LOD), the amount of overlap of the proposed Project right-of-way (ROW) with existing cleared ROWs, the acreage of forested habitat that would be affected by the LOD, and the acreage of forested habitat that would be replanted as part of the Project’s Post-Construction Planting Plan. Other considerations that were taken into account include whether or not Primary or Secondary Roost Trees are located within the Project LOD in BCA No.2 and the number of those primary or secondary roost trees that would be avoided due to engineering minimization efforts. Primary roost trees are identified as roost trees that are typically large (>9 inches DBH) with loose, exfoliating bark and a high degree of solar exposure. Secondary roost trees are identified as roost trees that are typically <9 inches in DBH with exfoliating bark, cracks, crevices, hollows (tree boles and limbs) and a lower degree of solar exposure (Apogee 2015).

For this Project, it was determined that approximately 1.4 acres of potential impacts (tree clearing) would occur in BCA No.2 at Raystown Lake. Based on the value of \$5,500 per acre, and a 2:1 ratio, SPLP will be required to provide the equivalent of approximately \$15,400 of compensatory mitigation. Approved USACE mitigation practices include but are not limited to: 1) installation of potential roost trees; 2) creation of snags; 3) invasive species control; 4) tree and shrub establishment; 5) habitat/tree management; 6) artificial roost installation; and, 7) public outreach.

### 4 SITE SELECTION

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In consultation with USACE, SPLP identified BCA No. 2 as the most suitable location for compensatory mitigation. This location was selected because it is the location that will be affected by the Project, and it is on the east side of Raystown Lake—an area that would neither affect current voluntary enhancements USACE has planned at the Raystown Lake nor interfere with recreational areas during the busy summer recreation season. Of the 1.4 acres of impacts within BCA No. 2, approximately 1.0 acre is currently forested and will be permanently converted to an herbaceous cover type and maintained as part of the 50-foot ROW. The remaining 0.4 acre of cleared land would be temporary Project LOD areas (i.e., access,

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<sup>1</sup> The current value is based on the Land Values 2015 Summary (USDA 2015).

temporary ROW, additional temporary workspace, staging areas) that would be reforested/revegetated as part of the Project (Figure 2). The cleared land that would be reforested (0.4 acre) has been selected as the location for creation of bat habitat, while the entirety of cleared land (1.4 acres) would be treated and monitored for invasive species. A location map showing the locations of the impact and where mitigation will occur is provided in Figure 2.

## 5 MITIGATION WORK PLAN

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### 5.1.1 Proposed Compensatory Mitigation Practices

Based on a site visit and meetings with USACE, the following compensatory mitigation practices are proposed at Raystown Lake BCA No. 2.

1. Artificial Roost Tree Installation and Snag Creation:

SPLP proposes to create new bat roosting locations through the installation of artificial roost structures, to be installed after construction of the Project is completed. Specifically, SPLP contractors will install approximately six (6) structures to compensate for the loss of approximately 1.4 acres of forested habitat at BCA No. 2 as a result of the Project. Artificial roost structures (refer to Appendix A) mimic the natural roosting habitat of bats and have been demonstrated as preferable for roost creation for forest bats when compared with traditional nursery style bat boxes. The artificial bark imitates the loose bark and thermal mass of a wildlife snag simulating the multiple cavities of a hollow tree providing habitat and space for bat usage. The structure will stand approximately 16 feet tall with the upper 3 feet of the structure containing artificial bark. Bat netting will also be attached to the structures to provide a rough surface to which bats can cling.

The artificial roost tree structures will be located within the cleared temporary workspace areas (which would be reforested as part of the Project Post-Construction Planting Plan). Since no roost trees were found within BCA No. 2, the specific work plan will be submitted and reviewed by USACE for approval of the locations, design, and monitoring protocols recommended for implementation. Note: Installation of the structures will require access to the area with a small excavator (e.g., John Deer 35 size).

In addition, this mitigation effort will girdle approximately 20 trees (cutting of the bark and portions of underlying layers) along the Project's temporary workspace edges. The snags created will provide additional roost sites for forest dwelling bat species. The trees to be girdled will be selected under the guidance of a qualified bat biologist and will occur under the supervision of USACE Raystown Lake staff/forester.

Estimated Cost - \$10,000 (estimate provided by AllStar Ecology, May 2016).

## 2. Invasive Species Control:

As part of the proposed compensatory mitigation practices, SPLP will implement invasive plant species control in areas off the Project ROW and as agreed to by the USACE within BCA No. 2 to help maintain a healthy forest habitat for forest dwelling bat species. This may include one (1) visit by an experienced and certified/registered professional hired by SPLP to spot treat invasive plant species (or selected undesirable vegetation) with an herbicide approved for use by the USACE. The visit will occur post - construction, to identify whether invasive plant species exist within the proposed construction workspaces. If existing invasive species are found, the populations will be treated to minimize the likelihood for these species to germinate and to help with bat habitat conservation in the area. During their visit, the contractor will identify and spot treat invasive plant species within USACE identified areas (Figure 2) within the BCA. It is noted that the acreage to be treated for invasive plant species will be determined by the number of invasive plant species identified during the site visit. Pending the actual site visit, it is estimated that approximately three to four (3-4) acres can be treated in one day; however if less invasive plant species are found in the area, additional acreage can be treated and vice versa. If more invasive plant species are identified, then less acreage can be treated. This mitigation practice of targeting invasive species will help increase sunlight and foraging areas for bats.

Estimated Cost - \$5,400 (estimates based on Williams Forestry & Associates costs for one visit, May 2016). Note: A different contractor may be chosen to conduct invasive plant species control to ensure maximum benefit for the estimated costs. In the event a different contractor is chosen, additional visits/acreage may be treated at this estimated cost.

### 5.1.2 Implementation Process

The compensatory mitigation practices identified above would be implemented during pre- and post-construction time periods, during or after the revegetation/restoration process, and would be coordinated with Raystown Lake staff to ensure that the approved procedures are followed appropriately, under supervision and approval of the USACE forester/staff.

### 5.1.3 Maintenance Plan

The following measures will be implemented to help ensure the success and viability of the bat habitat once initial construction/installation is complete:

- **Artificial Roost Tree Installation:**  
Once the artificial roost trees are installed, it is not anticipated that maintenance of the structures will be necessary based on past experience. Specifically, AllStar Ecology has stated that the structures should last for several years with no maintenance required.
- **Creation of Snags:**  
As noted above, tree snags will be created under the supervision of a USACE Raystown Lake forester. Once the tree snags are created, it is not anticipated that maintenance of the trees will be necessary.

- **Invasive Species Control:**

As noted above, maintenance of invasive plant species will occur via herbicide spot treatments within the Project ROW through BCA NO. 2 in two (2) visits: one (1) pre-construction and one (1) post-construction.

#### 5.1.4 Monitoring and Reporting

##### **Artificial Roost Tree Installation**

Per discussion with USACE's Baltimore District, no monitoring by SPLP will be required post-installation of the artificial roost structures. USACE Raystown Lake staff will conduct long-term monitoring to determine the success and operations of the artificial roost tree structures and their effects on bat habitat.

##### **Creation of Snags**

Similar to the artificial roost tree structures, the snags created by SPLP post-construction will be monitored by USACE Raystown Lake staff to determine the operational success of the snags related to bat species.

##### **Invasive Species Control**

SPLP will monitor invasive species within the Project ROW through BCA No.2 for approximately one (1) year. Following the second visit, SPLP contractors will provide a status report to USACE Raystown Lake staff.

## 6 REFERENCES

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Apogee Environmental, *Myotis* Summer and Winter Habitat Assessment for the Pennsylvania Pipeline Project on U.S. Army Corps Properties, Pennsylvania; Apogee Project No. 15-720.00; December 2015.

U.S. Army Corps of Engineers, Baltimore District, Raystown Lake Bat Conservation Area Compensatory Mitigation Requirements, January 2016.

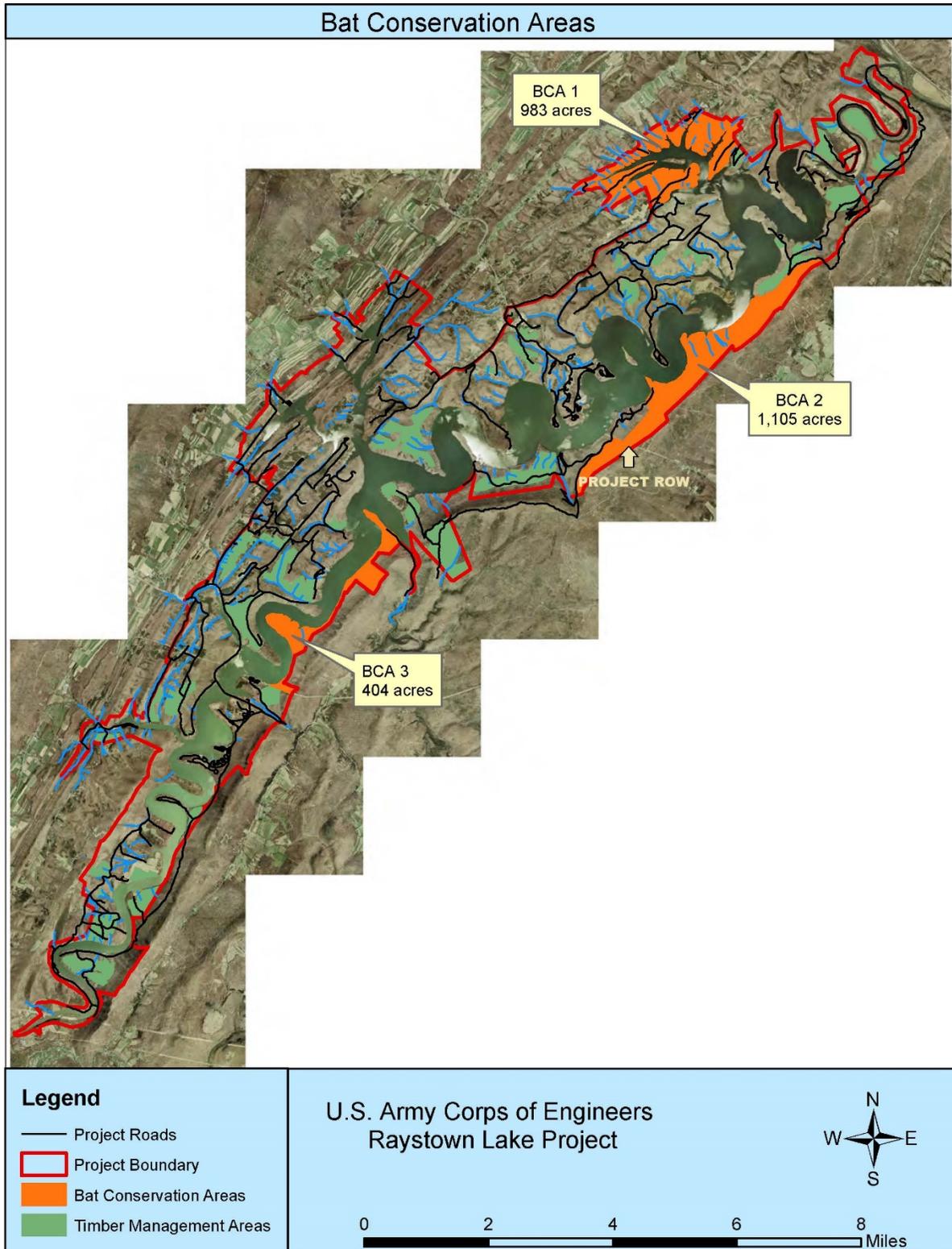
U.S. Department of Agriculture, National Agricultural Statistics Service, Land Values 2015 Summary, ISSN 1949-1867 August 2015; Available online at: <http://usda.mannlib.cornell.edu/usda/current/AgriLandVa/AgriLandVa-08-05-2015.pdf>

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Figure 1 – Established Bat Conservation Areas at Raystown Lake



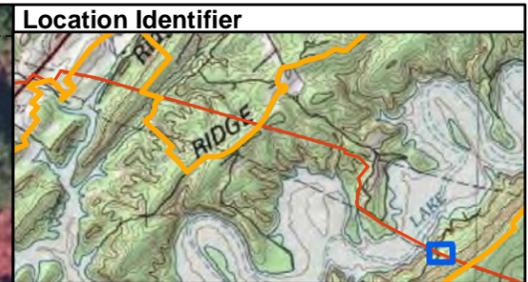
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# USACE - Raystown Lake Property

Note: The permanent and temporary ROWs within the BCA will be treated and monitored for invasive plant species pre-construction and one (1) year post-construction, respectively.



**Legend**

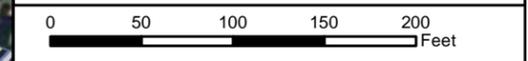
- Raystown Lake Bat Conservation Area
- Invasive Plant Species Control Area
- HDD
- Proposed Pipelines
- HDD Entry/Exit
- USACE Entry/Exit
- 50-foot ROW
- 20 Foot Spoil Space
- Temporary Construction Workspace
- ROW - ATWS
- ROW - Drive-Through - Clearing Only
- ROW - Drive-Through - Travel Only
- ROW - Permanent Access Road
- ROW - Temporary Access Road
- Stream
- Wetland
- USACE Property
- County Boundary

Impacted Bat Conservation Area:  
 Total area in construction ROW - 2.2 Acres  
 Total area tree clearing - 1.4 acres

Invasive plant species will be treated using herbicides approved by Raystown Lake staff and will be dependent upon the type of invasive plant species found in the area.

Tree Girdling/Artificial Roost Structures will be installed within the Temp ROW. Specific locations will be field determined in consultation with Raystown Lake staff.

**Figure 2 - Project ROW Through Raystown Lake Bat Conservation Area**



Sheet 1 of 2      Scale 1:1,200

Prepared By: **TETRA TECH**      Date: **05/2016**

Base Map;  
 ESRI World Imagery, October 2011  
 Coordinate System NAD 83  
 Stateplane, PA South, Feet

USACE Parcels:  
 County Assessment  
 GIS Shapefiles

BUFP:GIS\PROJECTS\112C06969-PPP\MAXDIPERIMITS\FIGURE X - RAYSTOWN LAKE BCA.MXD 6/23/2016 LN



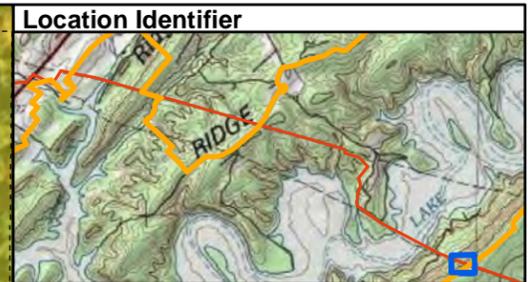
# USACE - Raystown Lake Property

Note: The permanent and temporary ROWs within the BCA will be treated and monitored for invasive plant species pre-construction and one (1) year post-construction, respectively.

Tree Girdling/Artificial Roost Structures will be installed within the Temp ROW. Specific locations will be field determined in consultation with Raystown Lake staff.

Impacted Bat Conservation Area:  
Total area in construction ROW - 2.2 Acres  
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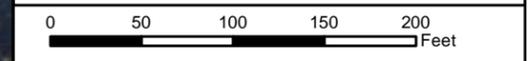
Invasive plant species will be treated using herbicides approved by Raystown Lake staff and will be dependent upon the type of invasive plant species found in the area.



**Legend**

- Raystown Lake Bat Conservation Area
- Invasive Plant Species Control Area
- HDD
- Proposed Pipelines
- HDD Entry/Exit
- USACE Entry/Exit
- 50-foot ROW
- 20 Foot Spoil Space
- Temporary Construction Workspace
- ROW - ATWS
- ROW - Drive-Through - Clearing Only
- ROW - Drive-Through - Travel Only
- ROW - Permanent Access Road
- ROW - Temporary Access Road
- Stream
- Wetland
- USACE Property
- County Boundary

**Figure 2 - Project ROW Through Raystown Lake Bat Conservation Area**



Sheet 2 of 2 Scale 1:1,200

Prepared By: **TETRA TECH** Date: **05/2016**

Base Map;  
ESRI World Imagery, October 2011  
Coordinate System NAD 83  
Stateplane, PA South, Feet

USACE Parcels:  
County Assessment  
GIS Shapefiles

BUFP-IGIS/PROJECTS/112C06969-PPP/IMXD/PERMITS/FIGURE X - RAYSTOWN LAKE BCA.MXD 6/23/2016 LN



## **Appendix A**

### **Artificial Roost Structure/Tree Girdling Information**

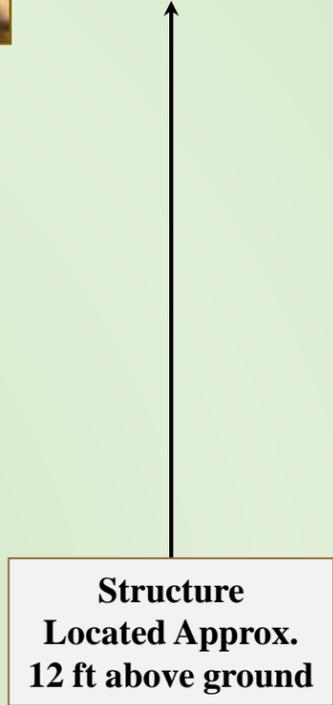
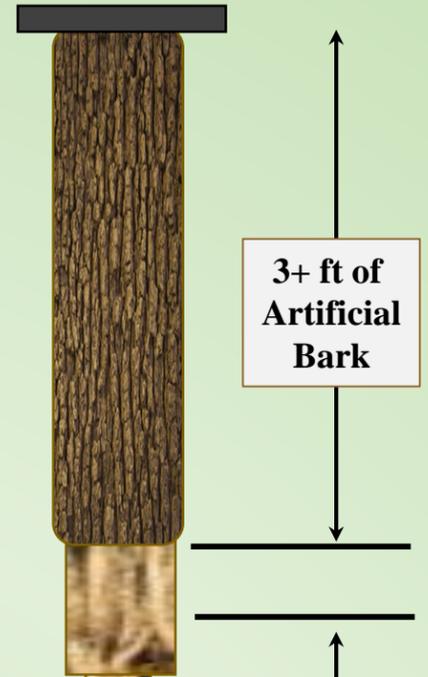
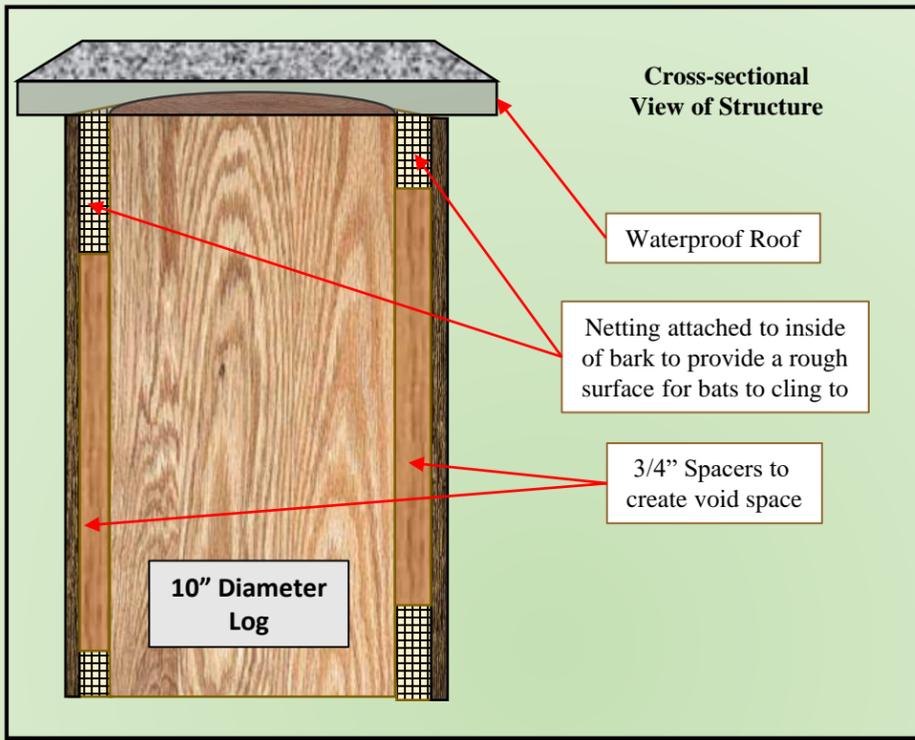
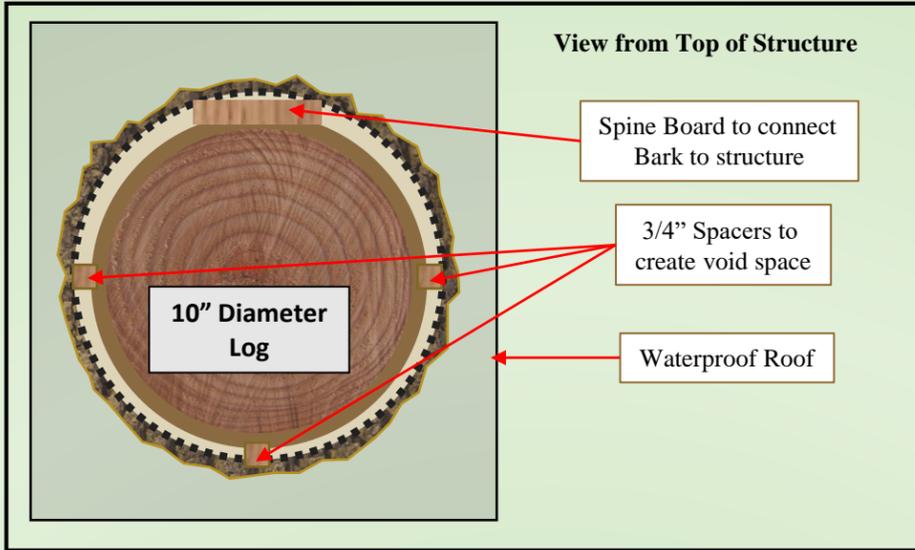
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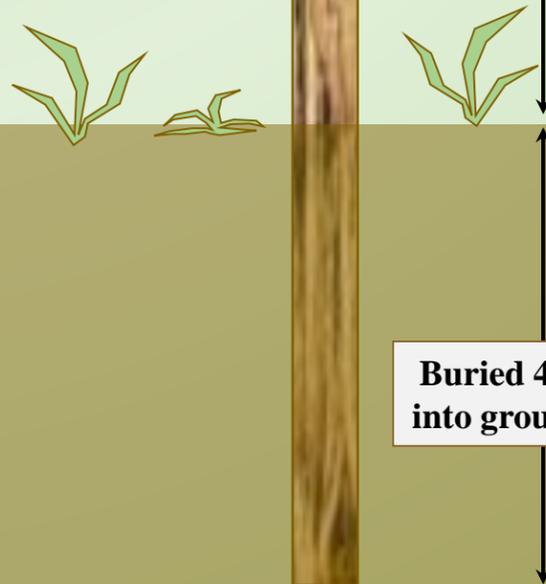
# ALLSTAR ECOLOGY, LLC

## Option 1: Constructed Artificial Bark Structure



**16 ft 6x6 post**

**Buried 4 ft into ground**



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# Methods for Girdling Trees for Wildlife Habitat Improvement



Prepared by



March 2015

# Introduction

## What is a Snag?

There are numerous management techniques to improve the quality of the forest. Traditional methods for timber stand improvement include the removal of unwanted trees to release growing space for desired tree species. The complete removal of unwanted tree species often has a detrimental effect to wildlife. Standing dead and dying trees, called "snags" or "wildlife trees," are important for wildlife in both natural and landscaped settings. Snags are natural occurring as a result of disease, lightning, fire, animal damage, too much shade, drought, root competition, as well as old age. Birds, small mammals, and other wildlife use snags for nests, nurseries, storage areas, foraging, roosting, and perching.

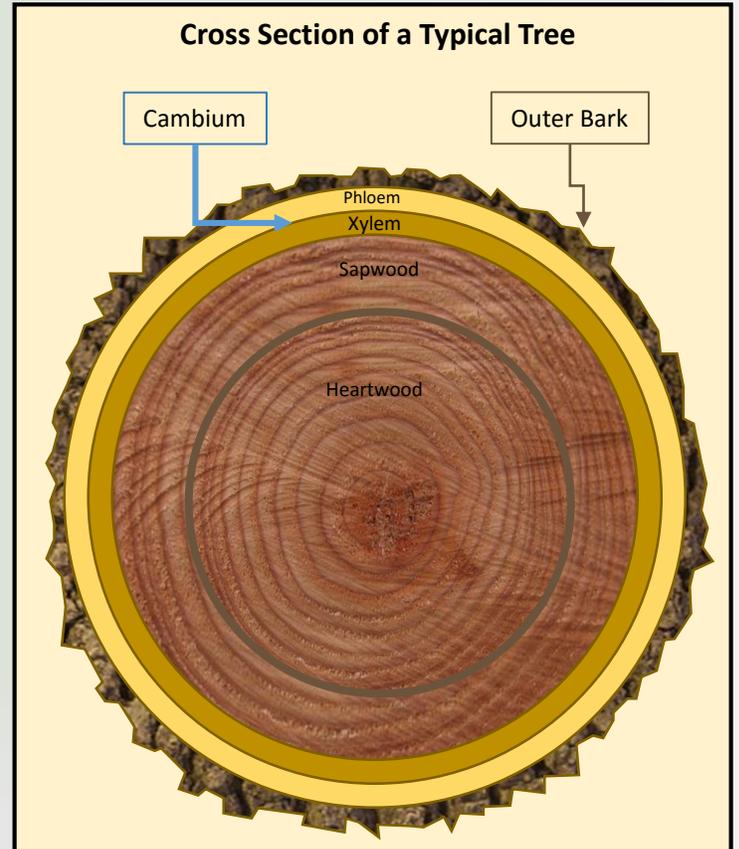
Snags can be created by killing a tree without removing it. Methods for snag creation vary and can determine the longevity and fate of the snag.



## Typical Wildlife Snag



# Girdling for Snag Creation



## How Girdling Works

Girdling is the traditional method for killing a tree without felling. The outer rings of a tree house the phloem and xylem, both necessary for the transport of vital water and nutrients throughout the tree. Girdling severs the bark, cambium and sometimes the sapwood in a ring entirely around the trunk of the tree effectively halting the exchange of sugars, minerals and water between the roots and the rest of the tree.

Once the cambium is severed and the bark is removed, the transport of water and nutrients ceases and the tree will die over time. Decay will slowly create habitat and foraging areas. Bark will slowly fall off the tree creating roosting habitat for wildlife.

## Improper Girdling

The Improper girdling of a tree can reduce the effectiveness of the snag:

- Ineffective girdling can fail to kill the tree.
- Cuts too far into the sapwood of the tree can reduce the integrity of the tree and create hazard trees and shorten the longevity of the wildlife snag.
- Timing is essential. Trees are most vulnerable early in the growing season just after rapid tissue growth has depleted carbohydrate reserves. Also the bark is "loose" in the spring and early summer when the cambium is active.

# Girdling for Snag Creation

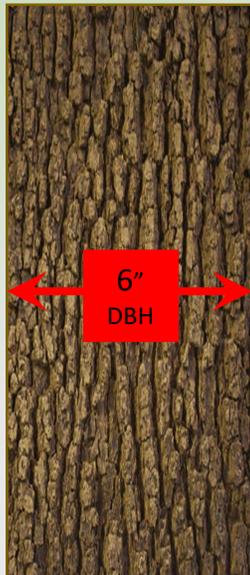
## Proper Girdling Techniques

### Chainsaw

Chainsaws are efficient tools to use for girdling trees. Two cuts are made and the bark and cambium between the two cuts are removed. Trees should be de-limbed beneath the cuts to inhibit regrowth and sprouting.

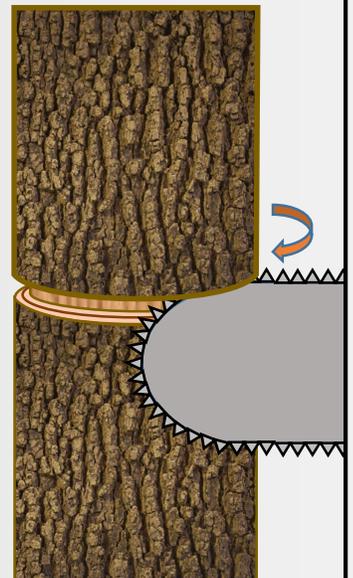


To create a successful wildlife snag, trees must be selected that have certain characteristics. Hardwood species such as oak, maple, locust and hickory decay at a slower rate and as a result, are longer lasting. They also tend to retain their bark longer after the trees die creating more roosting potential than species that decay at a faster rate. Additionally, trees larger than 6 inches in diameter at breast height (DBH) are large enough to withstand high winds.

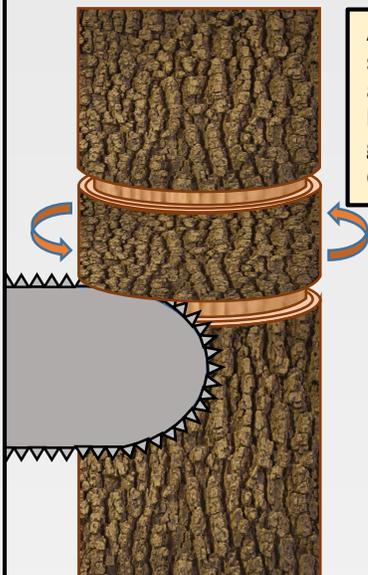


When using a chainsaw to girdle a selected tree, cut one groove completely around the tree at chest height. The groove must be deep enough to completely sever the phloem and cambium. For larger trees (greater than 10 in DBH) a groove cut 1.5 inches deep into the tree will be sufficient.

**\*\* REMEMBER \*\***  
Proper Chainsaw Safety



After the first groove, cut a second groove, completely around the tree, 2-3 inches below the first groove. The groove must be 1.5 inches deep.



Once the two grooves are cut, the bark and the cambium between the two chainsaw cuts must be removed completely around the tree through the use of a wood chisel or sharp wedge. This removed area is called the kerf. A kerf, 2-3 inches wide should be sufficient to prevent the regrowth of the cambium and should successfully kill the tree.

