United States Department of Agriculture

CONSERVATION ENHANCEMENT ACTIVITY

CONSERVATION STEWARDSHIP PROGRAM

E666O

Snags, den trees, and coarse woody debris for wildlife habitat

Conservation Practice 666: Forest Stand Improvement

APPLICABLE LAND USE: Forest, Associated Ag Land, Farmstead

RESOURCE CONCERN: Animals

ENHANCEMENT LIFE SPAN: 10 Years

Enhancement Description

Improve wildlife habitat through creation and retention of snags, den trees, wolf trees, forest stand structural diversity, and coarse woody debris on the forest floor, to provide cover, shelter, and other habitat features for native wildlife species.

Criteria

- States will apply general criteria from the NRCS National Conservation Practice Standard Forest Stand Improvement (Code 666) as listed below, and additional criteria as required by the NRCS State Office.
- Identify desired wildlife species that use snags, den trees, wolf trees, coarse woody debris, and/or brush piles for shelter, cover, perches, nest sites, rearing sites, etc.
- Manage for specific tree species, or a selected mix of species, size-classes, and stocking rates at the appropriate scale to meet desired wildlife habitat requirements.
- Create, recruit, and maintain sufficient snags, wolf trees, nest trees, cavity/den trees, and coarse woody debris to meet requirements of desired species. Arrange downed woody material into brush piles as appropriate for desired wildlife species. Refer to criteria in NRCS Conservation Practice Standard Upland Wildlife Habitat Management (Code 645) for manipulation of vegetation.

- The enhancement will comply with all applicable federal, state, and local laws and regulations, and with States' Forestry Best Management Practices for Water Quality.
- When determining which trees will be killed for snag creation, and/or used to create cavities/dens or perches, consider effects on the remaining stand.
    - Identify and retain preferred tree and understory species to achieve all planned purposes and landowner objectives.
    - Use available guidelines for species and species groups to determine spacing, density, size-class distribution, number of trees, and amount of understory species to be retained.
    - Refer to criteria in NRCS Conservation Practice Standard Integrated Pest Management (Code 595) to assist with site-specific strategies for pest prevention, pest avoidance, pest monitoring, and pest suppression.
    - Consider using downed woody material to create brush piles for additional wildlife habitat.

Documentation and Implementation Requirements:

Participant will:

- Prior to implementation, participant will work with NRCS to identify the desired wildlife species that use snags, den trees, coarse woody debris, perches, and/or brush piles for shelter, cover, nest sites, and/or rearing sites, and are likely to benefit from the enhancement.
- Prior to Implementation, participant will work with professional forester or NRCS to delineate on a map the acres that the enhancement would be applied.
- Prior to implementation, participant will work with professional forester or NRCS to estimate how many snags, wolf trees, den trees, coarse woody debris, and/or brush piles are present per acre on the acres identified.
- Prior to implementation, work with NRCS to determine how many snags per acre per size class would be needed in addition to those present that will benefit the wildlife species.

Desired Wildlife Species

Snags and Woody Residue size classes	Estimated Snags/Den Trees per Acre	Desired Snags/Den Trees per Acre	# of Snags/Den Trees per Acre to be Created
Snags 6-10 inch diameter at breast height.		2 or more	
Snags 10-20 inch diameter at breast height		2 or more	
Snags >20 inch diameter at breast height		2 or more	
Large Woody Debris >20 inch diameter		1 or more	
Brush piles		1	

- During implementation, notify NRCS if any planned changes to verify they meet the enhancement criteria.
- During implementation, keep a written log and take digital photos of snag/den trees created and approximate locations on a map.

- After implementation, notify NRCS that the work has been completed; submit digital photos.
- After implementation, retain digital photos for NRCS to verify practice has been completed.

NRCS Will:

- Prior to implementation, provide and explain the following NRCS Conservation Practice Standards as they relate to implementing this enhancement.
    - Forest Stand Improvement (Code 666)
    - Upland Wildlife Habitat Management (Code 645)
- Prior to implementation, assist participant in determining which wildlife species will benefit from snags, den trees, coarse woody debris, and/or brush piles for shelter, cover, nest sites, and/or rearing sites.
- Prior to implementation, assist the landowners to delineate on a map the acres that the enhancement would be applied.
- Prior to implementation, assist the participant to determine the number of snags (by size class), den trees, coarse woody debris, and/or brush piles exist on the acres delineated by the enhancement. Determine the desired number, with the difference being the # of snags, den trees, coarse woody debris, and/or brush piles need to be created to meet criteria of the enhancement.
- During implementation, as needed, evaluate any planned changes to verify they meet the enhancement criteria.
- After implementation, verify that the number of snags, den trees, coarse woody debris, and/or brush piles have been created.

NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

Participant Name_____Contract Number _____

Total Amount Applied_____Fiscal Year Completed _____

_____ _____

NRCS Technical Adequacy Signature Date

2024 CSP ENHANCEMENTS – GUIDANCE & PERFORMANCE CERTIFICATION

E666O – Snags, den trees, and coarse woody debris for wildlife habitat

Conservation Practice 666: Forest Stand Improvement

BRIEF DESCRIPTION OF ENHANCEMENT: **Improve wildlife habitat through creation and/or retention of snags and den trees, OR creation of coarse woody debris on the forest floor OR provide cover/shelter for native wildlife species through brush pile creation while retaining forest stand structural diversity.**

Choose a group of species for management. (*Circle one choice below*)

- **Managing for bird species that use snags and cavities (will require snag creation)**

  OR

- **Managing for rabbits and small mammals (will require brushpile creation)**

  OR

- **Managing for reptiles and amphibians (will require creation of downed logs or will require retaining longleaf pine stumps).**

  Note: For any of the choices above, it is important to identify preferred tree species to retain. Refer to Alabama 645 standard and associated job sheets for recommended trees to retain to meet landowner's wildlife management objectives.

Managing for Birds and Tree Bats by Creating Snags and Den Trees

Snags are dead or partially dead standing trees that provide several important benefits to a variety of wildlife (see Table 2). Snags provide cavities for nesting and resting, perches for hunting and displaying, and an abundant supply of food for insect eaters. In Alabama, there are many species of birds and mammals that use snags at some point in their life cycles. Two such mammals are the Indiana bat and the Northern long-eared bat; they are federally listed species. In addition, many species of reptiles and amphibians also use the cavities in snags.

Table 2 - Some of the benefits provided for wildlife by snags

Cavities	Excavated in snags by primary cavity excavators like woodpeckers Used by woodpeckers for shelter and nesting cover Used for nest sites by secondary cavity nesters (i.e., those species unable to excavate their own cavities) like the wood duck, eastern bluebird, and gray squirrel.
Loose Bark	Begins to loosen as a tree dies and forms "bark cavities" Bark cavities are used for cover, as roost sites for forest dwelling bats.
Insects	Become abundant in the decaying wood of snags Provide a valuable food source for insect eaters like woodpeckers and nuthatches
Perch Sites	Perch sites are provided for many birds including songbirds like the indigo bunting (singing perch), raptors like American kestrel (hunting perch), and kingfishers like the belted kingfisher (fishing perch).

Different species of wildlife prefer different types and sizes of snags in a variety of habitats. Some species prefer hard snags (dead or partially dead trees with sound wood and some limbs remaining) while others prefer soft snags (also called "punky," in advanced stages of decay, and rarely with limbs). Some species, like wood ducks and barred owls, require large snags simply because they need large cavities in which to nest.

Other species, such as the tufted titmouse, will forage and nest in cavities inside smaller snags. To accommodate a variety of species, many landowners try to maintain several types and sizes of snags and den trees.

The best method to provide snags for wildlife is to retain existing snags in places where they will not create a dangerous situation for people using the nearby area for outdoor activities like hiking, hunting, or cutting firewood.

When the abundance or distribution of snags is inadequate or if particular types of snags are desired, snags can also be "created."

Landowner identifying a preferred tree to retain (i.e. not deaden)

Landowner deaden/girdling a tree with a chainsaw

Creating snags involves deadening trees so that they remain standing. Success depends on the method used, the tree species you are trying to deaden, the current health of the individual tree, and the specific site characteristics such as the presence of forest pests that may accelerate the tree's death.

Retaining or creating snags is often incorporated into other habitat management practices, such as crop tree release.

For instance, if clearing is planned to create an opening, some of the trees that could be removed while clearing could instead be deadened and left standing for use by wildlife.

If a forest-edge cutting or a tree and shrub release is planned, some of the trees that would be removed can instead be deadened and left standing.

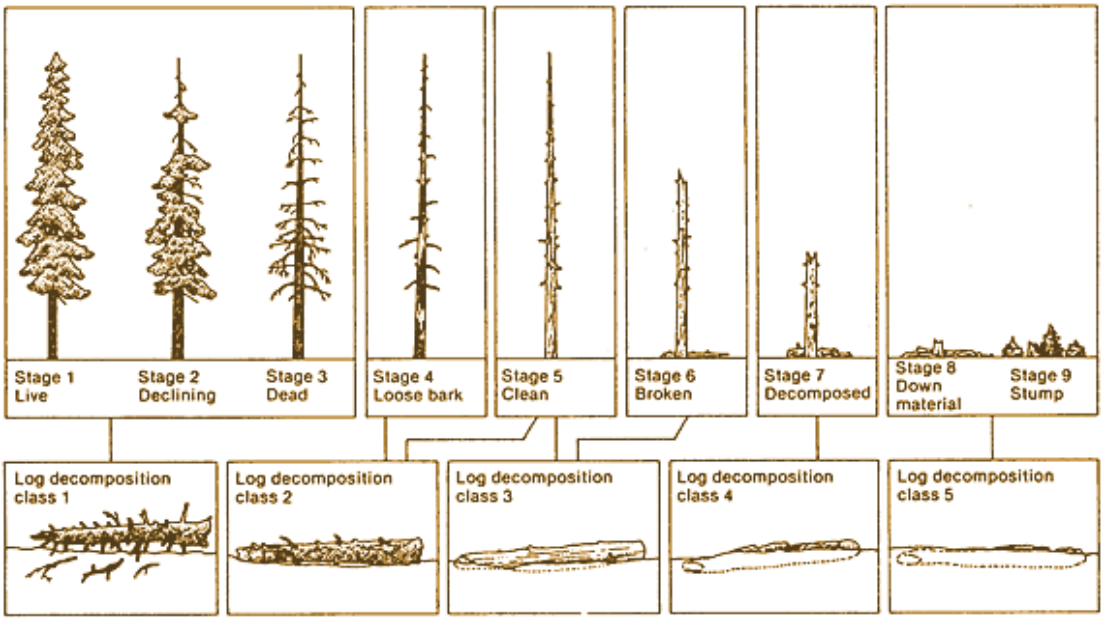

Figure 1. Snag and down wood decay classification system (Maser et al. 1979)

Requirements for Snag Creation Option:

- **Eligible Treatment Areas:** Hardwood forests and mixed pine-hardwood forests that are not in a burning regime. Pine stands are not eligible due to the combustible nature of dead snags.
- **Treatment Recommendations:** It is preferable to treat some acres at the start of the contract and the balance of the acres at the end of the contract, to spread out the time frame of available snags on the property.
- ***Small, Medium AND Large snags must be created or retained. Existing snags in stage 3 or 4, which is fresh dead or dead and holding bark, (see figure 1 above) will count toward required number of snags. Retained snags must be documented to be counted (flagged and photos taken).***
- **Small Trees**: Create a minimum of 2 snags per treated acre; between 6 inch and 10 inch diameter at breast height (dbh) **AND**
- **Medium Trees:** Create a minimum of 2 snags per treated acre; between 10 and 20-inch dbh AND
- **Large Trees:** Create a minimum of 2 snags per treated acre; greater than 20 inch dbh OR create a minimum of 4 snags per treated acre; 15 inches or larger. Tree sizes can be combined for the large tree class. Example, if a landowner enrolls 10 acres, they may create 10 snags greater than 20 inches in diameter and 20 snags that are 15 inches or larger to meet the qualifications for the large tree class on that 10 acres.
- Snags that are created can be scattered across the treatment area or they can be created in groups or clusters.
- Snags can be created by girdling or by injection with herbicides. IF girdling is the method of choice then a chainsaw should be used to make a solid cut through the bark and cambium into the wood that is carried all the way around the tree and crosses the cut made at the starting point. It is very important to ensure the cut gets down into the wood and completely severs the nutrient and water flow from the roots to the crown. Herbicide injection tends to be more effective on tree deadening than girdling, but herbicides can have residual effects if care isn't taken. Soil active herbicides dripping out of the cut on the target tree can damage other surrounding trees, so use soil active herbicides with caution. Also keep in mind that herbicides can sometimes travel from a target tree to a nearby non-target tree of the same species through root grafts. Follow all herbicide label directions.

Managing for Rabbits and Small Mammals by Creating Brush Piles

Brushpiles should be created evenly throughout the stand. It is best to start by selecting 2 or 3 low quality trees (from the timber and wildlife standpoint) and hinge cut them. While felling, direct the tops toward a central location to start the brushpile. Hinge cutting, also known as "creating living brushpiles", is the process of making a partial cut through the trunk of a small tree in order to fell the tree without completely removing it from the stump. The objective is for the tree to remain alive while lodged on the ground. This will create browse for a number of species, as well as escape and nesting cover for others.

It is best to review the stand to be treated with a forester or wildlife biologist to determine which species and which individual trees need to be removed. In general, remove lower quality species from both the wildlife and the timber management perspective. Common species to remove include ash, maple, sweetgum, blackgum, and elm. This method is NOT recommended for exotic invasive tree species, such as privet, chinaberry, paulownia, etc. This method will allow these species to continue to reproduce since they will remain alive after hinge cutting.

When practical, use hinge cutting to remove trees from the forest canopy that are crowding "crop" trees. Crop trees are trees that are superior in size and quality for wildlife mast and timber production. Trees that are hinge cut near crop trees will increase sunlight, nutrients and water to crop trees, increasing growth to those trees. These can be identified by a natural resources professional.

To complete a hinge cut, make a partial cut into the tree 2 to 3 feet from the ground. The cut should be on the opposite side of the tree from the direction the top needs to go when it falls. Stop the cut when it has severed from two-thirds to three-quarters of the stem. Often smaller trees can be given a push if they don't fall on their own. Be careful not to cut too much of the stem or the tree could snap off the stump when it falls. Also be sure to follow all standard safety procedures when cutting trees with a saw.

After hinge cutting several trees to start the brushpile, then cut several more low-quality trees and shrubs to pile onto the hinge cut tops. Continue until the brushpile is approximately 10 to 15 feet across and 4 to 6 feet high. If larger diameter (3+ inch) logs are used, then a 4 foot height it acceptable. If smaller diameter branches are mostly used, then a 6 foot height is better because smaller limbs decay faster.

Requirements for Brushpile Creation Option:

- **Eligible Treatment Areas for Brushpile Creation:** Any forest stand type is eligible for brushpile creation. **However,** do **NOT** locate brushpiles in timber stands that will be subject to prescribed burning.
- **Treatment Recommendations:** Brushpiles deteriorate naturally over time. Therefore, it is preferable to treat some acres at the start of the contract and the balance of the acres at the end of the contract, to spread out the time frame of available brushpiles on the property.
- Create 1 brushpile for every acre of habitat treated.
- Brushpiles should be evenly distributed across a timber stand.
- Locate brushpiles near the edges of open areas when possible. Rabbits forage in open areas along roads, firebreaks, wildlife openings, etc.

Managing for Reptiles and Amphibians:

Choose One of the Following Two Options: Creating Downed Woody Debris OR Retaining Vertical In-Ground Woody Debris

Creating Downed Woody Debris

Downed woody debris is very important for nutrient cycling and many species of wildlife. Many insects, amphibians and reptiles use woody debris, such as fallen trees. In addition, many mammals and birds forage on downed logs looking for insects and amphibians.

Larger downed woody debris, such as tree trunks, last much longer and have more insect and amphibian diversity than smaller debris such as the limbs and tops of trees. These logs can last for many years. Each stage of decay is important for use by certain species.

Larger trees also have more heartwood, which delays decay longer than a tree with all sapwood. Some species are more decay resistant than others. For example, trees from the oak family tend to decay slower than trees from lighter seeded species such as gum, maple or sycamore.

To create downed woody debris, chainsaw fell trees by cutting all the way through the tree, no more than 1 foot above ground level. Caution should be taken any time a chainsaw is used or trees are felled. Both can be extremely dangerous. For those unfamiliar with proper safety of chainsaw use and felling trees, it is recommended to hire a professional to fell the trees.

Requirements for Downed Woody Debris Option:

- **Eligible Treatment Areas for Creation of Downed Woody Debris:** Hardwood forests and mixed pine-hardwood forests that are not in a burning regime. Pine stands are not eligible due to the combustible nature of downed logs.
- **Treatment Recommendations:** It is preferable to treat some acres at the start of the contract and the balance of the acres at the end of the contract, to spread out the time frame of available woody debris on the forest floor across the property.
- **Trees to Fell:** Fell a minimum of 1 snag per treated acre; greater than 20 inches dbh **OR** fell a minimum of 2 snags per treated acres; greater than 15 inches dbh. Tree sizes can be combined for the treatment area. Example, if a landowner enrolls 10 acres, they may fell 5 trees greater than 20 inches in diameter and 10 trees that are 15 inches or larger to meet the qualifications on that 10 acres.

OR

Retaining Vertical In-Ground Woody Debris

Longleaf pine stumps are sought after by companies that extract the natural rosin from stumps. These stumps are purchased from landowners and harvested by pulling them from the ground and transported to processing facilities. This practice has financial benefits to landowners. Other landowner benefits, such as free site preparation for planting, often play a role in the decision to sell stumps. However, leaving stumps has advantages to many species of wildlife. The associated holes and cavities in the ground that are created through the varied stages of stump decay are used by many species of wildlife, including amphibians, reptiles, and small mammals. These are very important for certain species, such as the gopher frog.

"Stump removal ("stumping") eliminates a critical wildlife habitat that unfortunately is seldom considered. For millennia, the butts of dead—and often quite old--trees were an abundant feature across the landscape. Beneath the ground, decomposing and/or burned-out taproot and lateral roots created a network of cavities. These served a vital ecological function for a diversity of small mammals, reptiles, and amphibians taking shelter from winter cold, summer heat, and fire. The cut stumps of today provide the same function, provided they are left to decompose or burn out naturally." (this paragraph is an excerpt from Stump Removal and the Longleaf Ecosystem, which was published in the Longleaf Leader. Author: Mark Bailey, Conservation Southeast Inc.)

Requirements for Vertical In-Ground Woody Debris Option:

- The treatment area must have longleaf pine stumps. Stump sales are generally limited to areas that have longleaf pine stumps. Stump buyers will also harvest slash pine stumps, but only if they are as part of a mixed stand with longleaf. To be eligible, the area must have had a stand that contained at least 50% longleaf pine.
- Retain all pine stumps on the treatment area. (No stump sales are allowed on the treatment area)
- If the stand has had a stump sale in the past, then this enhancement is not eligible.
- If the stand has been replanted in trees that have not been thinned, then this enhancement is not eligible.
- *Minimum treatment area is 15 acres*. Less than 15 acres in one tract is not eligible for stump retention, but will still be eligible for snag creation, brush pile creation or downed woody debris creation. (There is a mobility cost that prevents companies from purchasing stumps on tracts smaller than 15 acres in size, so there is no need to pay landowners to retain stumps on acreage that is not in danger of stump sales)
- Stumps must be from natural stands or 30+ year old longleaf plantation pine and must be from mature (sawtimber size) trees to be eligible for this enhancement. Sawtimber size will average between 12 and 15 inches in diameter OR if they are older stumps (many years since timber harvest) they will be "lighter wood" or "fat lighter" stumps and can be smaller.
- Recently cut longleaf stumps can be identified by looking at the length of needles and size of twigs on the downed tops or having a forester look at the rings and pith of the

stump. Often, species in a cut stand can be identified by looking at boundary trees or adjoining natural stands.

- Older stumps will be any that are considered “lighter wood” stumps. Those will not need to be identified to species. Fat lighter stumps are the best quality stumps for processing, regardless of pine species.

E666O JOB SHEET

PRODUCER NAME:						DATE:	
TRACT NUMBER(S):						COUNTY:	
Field or Stand Number	Acres to be Treated	Number Small Snags Created - Retained	Number Medium Snags Created - Retained	Number Large Snags Created - Retained	Number of Brush Piles Created	Number of Logs Felled for Downed Woody Debris	Acres of Vertical In-Ground Woody Debris Retained (15 ac minimum)

BE SURE TO REVIEW NATIONAL CSP ENHANCEMENT DOCUMENT.

ATTACH COPIES OF REQUIRED DOCUMENTS AS NOTED BY THE ENHANCEMENT JOB SHEET. CHECK THE BOX OR OTHERWISE IDENTIFY THE SUPPORTING DOCUMENTATION.

- ☐ A COMPLETED E666O JOB SHEET
- ☐ MAPS OF THE AREA or LOCATION(S) OF THE PRACTICES
- ☐ PHOTO DOCUMENTATION OF ENHANCEMENT
- ☐ DATES AREAS WERE TREATED

Alabama Supplemental Guidance for CSP Enhancement

The attached documents support the full implementation of this Conservation Stewardship Enhancement. This information should be submitted after the practice is completed.

_____ _____

CSP Participant Name Date