United States Department of Agriculture

CONSERVATION ENHANCEMENT ACTIVITY

E666H

CONSERVATION STEWARDSHIP PROGRAM

Increase on-site carbon storage

CONSERVATION PRACTICE: 666 - Forest Stand Improvement

APPLICABLE LAND USE: Forest; Associated Ag Land; Farmstead

RESOURCE CONCERN: Soil, Air

ENHANCEMENT LIFE SPAN: 10 years

Enhancement Description

Use forest management techniques to maintain and increase on-site carbon storage in multiple species forest stands. These include, but are not limited to, applying uneven-aged management, using longer rotations, retaining cavity/den trees, snags, and down woody debris, and protecting or increasing soil organic matter.

Criteria

- Apply all of the following activities:
  - Retain all snags and downed woody debris of 6" diameter or larger at the base.
  - Identify leave-trees or clumps of trees that will be retained on site throughout their life span. These would ideally be trees that also provide wildlife habitat (e.g., future cavity/den trees, species that develop loose bark at older ages, mast producers, etc.).
  - Close unneeded roads and limit off-road vehicular traffic to avoid displacing the forest litter layer.

- Apply at least one activity from among the following as appropriate for the site:
  - Transition from even-aged to uneven-aged management.
  - Use regeneration methods (e.g., group selection, shelterwood, seed-tree, expanding gap) that call for retention of mature trees during the period when advanced regeneration develops.
  - Adopt techniques for maintaining and/or improving soil quality, specifically retention or organic carbon.
  - Maintain canopy cover to shade the forest floor and avoid hastening decomposition.

- During forest management activities, apply the following criteria:
    - 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. Schedule treatments to maintain the stand, as much as possible, consistent with chosen regeneration method, in a fully stocked condition based on appropriate stocking guide.
    - Describe the current and desired future condition of each stand that will be treated. Include the species, cover type, and size-class distribution. Stocking will be described in terms of crop trees per acre, basal area per acre, trees per acre, between-tree spacing, or by any other appropriate and professionally accepted density or stocking protocol.
    - Implement forest stand improvement activities in ways that avoid or minimize soil erosion, compaction, rutting, and damage to remaining vegetation, and that maintain hydrologic conditions. Refer to Conservation Practice Standard Forest Trails and Landings (Code 655) and Road/Trail/Landing Closure and Treatment (Code 654).
    - The enhancement will comply with all applicable federal, state, and local laws and regulations, and with States' Forestry Best Management Practices for Water Quality.

Documentation and Implementation Requirements

Participant will:

Prior to implementation:

- develop a new or updated forest management plan (FMP) that may reflect a change in management objectives, as needed.
- review NRCS Conservation Practice Standard Forest Stand Improvement (Code 666) that contains information needed to meet criteria for this enhancement.
- develop an understanding of the management that this is required to increase carbon storage appropriate for the resource setting to include the following activities:
    - implement forest management activities that begin a transition from even-aged to uneven-aged management.
    - retain dead wood and select trees or clumps of trees that are intended to be left on the site throughout their life span.
    - use regeneration methods (e.g., group selection, shelterwood, seed-tree, expanding gap) that require retention of mature trees during the period when advanced regeneration develops.
    - adopt techniques for maintaining and/or improving soil quality, specifically retention of organic carbon.

  - maintain canopy cover to shade the forest floor and avoid hastening decomposition.
- For forest lands, work with professional forester to prepare or update a current FMP that includes activities required to implement this enhancement. NRCS State Office will determine if a FMP will be required for Associated Ag Land or Farmstead settings. (Request NRCS technical assistance, as needed.)
- Arrange to have a professional forester or wildlife specialist, as part of developing or updating an FMP:
  - identify and map areas, selected trees, or groups of leave trees that can serve as wildlife habitat and that are intended to be left on site throughout their lifespan.
  - describe amounts and condition of standing snags and fallen woody debris with 6" or larger basal diameter.
  - identify and map trails or roads that can be planned for closure.
- Recognize that other NRCS Conservation Practice Standards may be needed to apply this enhancement. These may include:
  - Forest Trails and Landings (Code 655)
  - Road/Trial/Landing Closure and Treatment (Code 654)
  - Woody Residue Treatment (Code 384)
- Acquire all necessary approvals and permits (i.e., local, state, or federal, as applicable).

☐ During implementation:

- Follow FMP guidelines follow state-approved Forestry Best Management Practices (BMPs) to protect streams, water quality, and minimize soil loss.
- Follow FMP guidelines, criteria in NRCS Conservation Practice Standard Forest Stand Improvement (Code 666), and in specifications provided by NRCS, to ensure that:
  - overstory tree and understory species are retained to achieve all planned purposes and landowner objectives.
  - establish required spacing, density, size-class distribution, number of trees, and amount of understory species to be retained.
  - schedule treatments to maintain the stand, as much as possible, consistent with the chosen forest regeneration method, in a fully stocked condition based on appropriate stocking guide.
  - avoid or minimize soil erosion, compaction, rutting, and damage to remaining vegetation, and that maintain hydrologic conditions.
- Evaluate and review with NRCS any planned changes to verify they meet the enhancement criteria, as needed.

☐ After implementation:

- Ensure that retained leave areas are properly protected.
- Update the FMP to documentation treatment acres, completion dates and methods, and document representative treatments with digital photos.

- Notify NRCS that the work has been completed and make treatment documentation available for NRCS review and certification.

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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)
  - Woody Residue Treatment (Code 384)
- Provide technical assistance in, as needed:
  - Guiding the proper sequence and timing of planned FMP treatment activities to meet requirements to maintain and increase on-site carbon storage.
  - Preparing specifications for applying this enhancement for each site using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.
- Ensure that the participant has a current and complete FMP describing all treatment activities for the resource setting.

☐ During implementation:

- Provide technical assistance if requested by the participant.
- Evaluate any planned changes to verify they meet the enhancement criteria.

☐ After Implementation:

- Verify the enhancement was implemented according to the NRCS Conservation Practice Standard Forest Stand Improvement Standard (Code 666) specifications and meets enhancement criteria.

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

USDA United States Department of Agriculture

Conservation Enhancement Activity

E666H – Mississippi Addendum

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Additional Criteria for Mississippi

Producer should follow Mississippi's Best Management Practices for forestry for any harvesting operations. Guidance how to implement best management practices can be found at The Mississippi Forestry Commission's Best Management Practices Manual.

Applicable Forest Stand:

All actively managed forested acres (pine or hardwood). This enhancement will only be applicable to sites that can be transitioned from even-aged to uneven-aged management.

Minimum Specifications:

This enhancement is properly implemented when forest stands are properly managed according to a current forest management plan that ensures fully stocked stands that increase species diversity, multiple age classes, and long-term carbon storage.

- **All snags and downed woody debris 6" diameter or more will be retained and the number of retained snags in the planned area will be recorded in the forest management plan.**
- **When adopting techniques to maintain and or improve soil quality, new woody debris will be created, by pruning, hack-n-squirt, etc. and left standing or down on the forest floor to decompose.**
- **When maintaining canopy cover to slow decomposition, the planned area will maintain a average basal area between 75-100 sq ft per acre and some mature trees will be marked and maintained for regeneration during any harvest operations. Sample plot data documenting average stand basal area will be included in the FMP.**
- **A forest management plan will be developed or updated that details the management activities that will be done to properly implement this enhancement.**
- **Treatment areas will be delineated on a map and existing conditions for each stand will be documented in the FMP. Digital photos and FMP will also be provided by the participant prior to payment.**
- **Openings created using E666K for structural diversity cannot be counted towards this enhancement.**

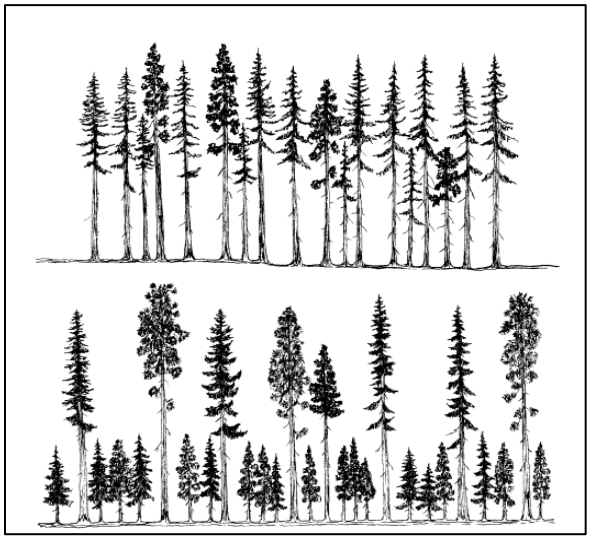
Enhancement Description:

Use forest management techniques to maintain and increase long term on-site carbon storage. This enhancement includes the development and implementation of a new or updated forest management plan that plans management activities that increase species diversity, multiple age classes, creation and retention of woody debris, and the protection of organic material from rapid decay during the life span of the enhancement.

Forest Management Plan Criteria:

A forest management plan that will be submitted for this enhancement will comply with NRCS's national policy on required forest management plan criteria. Additionally, forest management plans will be prepared by a registered forester in the state of Mississippi. See NRCS Edirectives section 190 ecological sciences, manuals part 536-Conservation Planning subpart B – Forest Management Plan Criteria for the national policy.

https://directives.sc.egov.usda.gov/landingpage/d1d8b01a-261d-4984-b5a0-1bf1f0607cda



Example illustration of the visual difference between even aged and uneven-aged management. Top image displays an even aged forest, and the bottom image displays an uneven-aged forest.

An uneven aged forest consists of at least 3 or more different age classes, whereas an even aged consists of 1.

Reference Material:

For more information regarding some management strategies refer to the publications listed below.

Frazier, J. E., Sharma, A., Johnson, D. J., Andreu, M. G., & Bohn, K. K. (2021). Group selection silviculture for converting pine plantations to uneven-aged stands. *Forest Ecology and Management*, *481*, 118729.

https://www.aces.edu/blog/topics/forestry/uneven-aged-management-of-longleaf-pine-an-often-overlooked-option-for-landowners/

https://programs.ifas.ufl.edu/florida-land-steward/forest-management/uneven-aged-management/#:~:text=In%20uneven%2Daged%20management%2C%20we,the%20growing%20space%20to%20regeneration.