**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET**

# FOREST STAND IMPROVEMENT

**(ACRE)**

**CODE 666**

## Definition

The manipulation of species composition, stand structure and stocking by cutting or killing selected trees and understory vegetation.

## Purpose

1. Increase the quantity and quality of forest products by manipulating stand density and structure.
2. Development of renewable energy systems.
3. Initiate forest stand regeneration.
4. Reduce wildfire hazard.
5. Improve forest health reducing the potential of damage from pests and moisture stress.
6. Restore natural plant communities.
7. Achieve or maintain a desired native understory plant community for special forest products, grazing, and browsing.
8. Improve aesthetic and recreation, values.
9. Improve wildlife habitat.
10. Alter water yield.
11. Increase carbon storage in selected trees.

Specifications are divided into the following categories indicated in italics:

*Pre-commercial Thinning-Hardwood Hand tools* used for purposes 1-7, 9-11

*Pre-commercial Thinning-Softwood Hand tools* used for purposes 1-7, 9-11

*Timber Stand Improvement-Chemical, Ground* used for purposes 1-11

*Competition Control-Mechanical* used for purposes 1-7, 9-11

*Thinning for Wildlife and Forest Health* for purposes 1-11

*Tree Marking* used for the purposes 1-11

*Patch cut* used for purposes 1-11

*Crop/Mast tree release* is for purposes 1,8,9

Practice Design shall include the results of the assessment and recommendations for all necessary treatments.

## Documentation

All categories require the following design information:

1. Landowner and Design Preparer name and address.
2. Property Location, including town and county, and NRCS Field Office.
3. Practice name, code, justification, extent, estimated cost, and time schedule.
4. Description of specific work to be performed and its location and size,

as well as written instructions for contractor and/or owner.

5. Description of layout and marking methods. Treatment areas and trees to be cut/removed will be designated with paint. If other marking methods are used, design will have specifically written guidelines.
6. Maps of property and practice locations, including a lat/long for boundary corners and practices.
7. Specifications for the protection of other natural resources including but not limited to water, soil, and wildlife and non-target plants.
8. The design shall also identify where and if recommended treatments also necessitate application for permits or variances from local, state or federal regulations.
9. The expected composition, stocking, growth and quality of the future or residual stand, and its susceptibility to further insect/disease will be described and regeneration needs will be addressed, if applicable.
10. If chemicals are used, the WIN-PST program will be used to evaluate potential risks to humans and/or fish, as appropriate, for each pesticide to be used. The minimum level of mitigation required for each resource concern is based on the final risk ratings in the WIN-PST (refer to IPM code 595).
11. Any variance from the specification guide must have written justification and be mutually agreed upon by TSP Forester and NRCS Field Office.

**Pre-commercial Thinning – Hardwood Hand tools**

This thinning is intended to increase the quantity and quality of forest products, and improve growth, vigor, and composition of seedlings and saplings in hardwood dominated stands.

This thinning will address the following resource concerns: Plant Condition- Plants not adapted or suited and/or Plant Condition – Productivity, health and vigor.

The thinning will take place in stands where the average DBH is less than 5 inches and stocking exceeds the recommended fully stocked level for the species and site, resulting in much slower growth than is reasonable or expected for the site.

The operation is carried out using hand tools such as chainsaws or brush saws.

Selection of species to favor will be justified based on stand type, stand structure, and silvicultural guidelines within the management plan.

Residual Stand will be well distributed and fall within the following ranges of spacing:

| | | |
|---|---|---|
| Seedling | 6’ X 6’ | or 1,210 trees/ac. |
| Sapling | 8’ X 8’ | or 681 trees/ac. |
| | 10’ X 10’ | or 436 trees/ac. |

Trees to be removed will be completely killed by severing at ground level or below the base of the lowest live branches, girdling, or other methods as may be deemed effective. If killed trees are not removed from the stand, they must be placed in a manner that does not impede growth of the desired residual stand.

**Pre-commercial Thinning – Softwood Hand tools**

This thinning is intended to increase the quantity and quality of forest products, and improve growth, vigor, and composition of seedlings and saplings in softwood dominated stands. (Purposes 1 - 7).

This thinning will address the following resource concerns: Plant Condition- Plants not adapted or suited and/or Plant Condition – Productivity, health and vigor.

The thinning will take place in stands where the average DBH is less than 5 inches and stocking exceeds the recommended fully stocked level for the species and site, resulting in much slower growth than is reasonable or expected for the site.

The operation is carried out using hand tools such as chainsaws or brush saws.

Selection of species to favor will be justified based on stand type, stand structure, and silvicultural guidelines within the management plan.

Residual Stand will be well distributed and fall within the following ranges of spacing:

| | | |
|---|---|---|
| Seedling | 6’ X 6’ or | 1,210 trees/ac. |
| Sapling | 8’ X 8’ or | 681 trees/ac. |
| | 10’ X 10’ or | 436 trees/ac. |

Trees to be removed will be completely killed by severing at ground level or below the base of the lowest live branches, girdling, or other methods as may be deemed effective. If killed trees are not removed from the stand, they must be placed in a manner that does not impede growth of the desired residual stand.

**Timber Stand Improvement - Chemical, Ground**

This thinning is intended to control woody or herbaceous vegetation that competes directly with existing, desirable, naturally regenerated or planted tree seedlings in a forest stand by reducing vegetative stocking of undesirable species on a site**.**

Include sufficient data to show that adequate desirable regeneration is present, and that existing competing vegetation will prevent or substantially delay (>10 years) the successful development of desirable tree seedlings unless the recommended competition control measures are taken.

Identify the vegetation to be removed and provide information to assure effectiveness of the methods used. The vegetation to be removed will typically consist of tree seedlings/sprouts, woody shrubs, or small saplings (<4” dbh) within the understory that compete directly with more desirable tree seedlings/saplings.

The residual seedlings are well established, 1 foot tall or taller.

Residual Stand will be well distributed and fall within the following ranges of spacing:

| | | |
|---|---|---|
| Seedling | 6’ X 6’ or | 1,210 trees/ac. |
| Sapling | 8’ X 8’ or | 681 trees/ac. |
| | 10’ X 10’ or | 436 trees/ac. |

Competition control will occur through application of herbicides. For identified water quality concerns related to leaching, solution runoff and adsorbed runoff, refer to Pest Management, Code 595, Standard and Specifications. USDA-NRCS WIN-PST program will be used to evaluate potential risks to humans and/or fish.

**Competition Control - Mechanical**

This thinning is intended to increase the quantity and quality of forest products, and improve growth, vigor, and composition of sapling, polesize and small sawtimber stands.

This thinning will address the following resource concerns: Plant Condition- Plants not adapted or suited and/or Plant Condition – Productivity, health and vigor.

The thinning will take place in a stand of trees adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked.

The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods will be necessary.

Mechanical equipment is used to control vegetation that is competing with desirable trees or to reduce the stocking level of a stand of desirable trees.

The sapling, polesize and small sawtimber stands to be retained will be marked by a TSP.

Selection of trees to favor will be justified based on stand type, stand structure, and silvicultural guidelines within the management plan.

Residual Stand will be well distributed and fall within the following ranges of spacing:

| | | |
|---|---|---|
| Sapling | 8’ X 8’ or | 681 trees/ac. |
| | 10’ X 10’ or | 436 trees/ac. |
| Polesize | 12’ X 12’ or | 303 trees/ac. |
| | 15’ X 15’ or | 194 trees/ac. |
| Sawtimber | 19’X 19’ or | 121 trees/ac. |
| | 25’X 25’ or | 70 trees/ac. |

Trees to be removed will be completely killed by severing at ground level (or below the base of the lowest live branches, girdling, or other methods as may be deemed effective). If killed trees are not removed from the stand, they must be placed in a manner that does not impede growth of the desired residual stand.

**Thinning for Wildlife and Forest Health**

This thinning is intended to manage the density, vigor, and composition of sapling, poles and small sawtimber stands to promote food and cover for specific wildlife species or species guilds and/or to diversify habitat structure, species composition, and arrangement to increase wildlife species diversity as well as protect, improve, or restore forest health.

*Forest Health* thinning is intended to reduce stand susceptibility (likelihood of the stand being attacked) and/or vulnerability (likelihood of mortality of individual trees) associated with one or more of the following situations:

a. Spruce-fir stands affected by one or more agents including balsam woolly adelgid, spruce bark beetle, dwarf mistletoe, and/or coastal spruce decline.

b. Hemlock in softwood or mixedwood stands, susceptible/vulnerable to hemlock woolly adelgid.

c. White pine stands affected by blister rust, drought, and/or other agents specific to white pine.

d. Stands in which diseased American beech is a significant component. (>50% of basal area).

e. Other stands, as recommended in the Forest Management Plan, with a significant occurrence of insect-infested, cankered, or otherwise diseased stems that could restrict the vigor of the stand or pose a hazard to remaining trees.

*Thinning for Wildlife* is intended to treat wildlife habitat concerns identified during the conservation planning process to enable movement, or provide shelter, cover

and food in proper amounts, locations and times to sustain desired wildlife during all or portion of their life cycle.

Refer to NRCS conservation practice standard Early Successional Habitat Management, code 647 or Upland Wildlife Habitat Management 645, for scenario specifications.

**Patch Cut**

This silvicultural method intended to regenerate shade-intolerant tree species, and to control forest insects and pathogens.

Situations where patch cuts is likely to be an appropriate regeneration method include:

- forest stands consisting primarily of suppressed or deformed trees of low value or desirability;
- stands that are suffering extensive damage due to insects, disease, wind or fire,
- areas where regenerating shade-intolerant tree species is the objective

Cutting/removal may occur through felling, complete double girdling, or similar methods. Where cutting/ removal will result in a residual stand of <30 square feet per acre in patches that will exceed 5 acres refer to Maine Forest Practices Act: Forest Regeneration and Clearcutting Standards.

If herbicides are used, care must be taken to avoid unintended backflash (Backflash involves the movement of herbicides through root grafts in some species.) For identified water quality concerns related to leaching, solution runoff and adsorbed runoff, refer to Pest Management, Code 595, Standard and Specifications. USDA-NRCS WIN-PST program will be used to evaluate potential risks to humans and/or fish.

**Tree Marking**

Tree Marking is a management tool that will allow a Licensed Forester to designate trees to remove or retained and to achieve multiple benefits within the woodlot. (Purpose 1-9)

Prior to any tree marking, a silvicultural prescription and marking guidelines will be developed. The prescription will provide the Licensed Forester with a description of layout, marking methods and contain the following:

- Desired residual stocking.
- Selection criteria for cut and leave trees
- Boundaries of treatment area
- Paint method to use for each marking purpose.

**Crop/Mast Tree Release**

Crop/Mast trees are trees that produce or have the potential to produce the desired resource benefits.

All Crop trees will have the following characteristics:

a. In need of being released. Not free to grow on three or four sides.
b. Live Healthy Crown ratio >30%, Diversity of species is desirable.
c. Expected longevity of 20+ years after treatment.
d. Species well adapted to the site.
e. Crop trees will be a minimum of 3" DBH and at least 25' tall.

*Wildlife objective*

a. Mast Trees include species producing nuts, seeds, berries and/or fruit shall be retained in large enough numbers to ensure a reliable annual food supply,

and a supply of food through the growing season.
b. Retain 4 or more, preferably large, mast trees per acre if available
c. There will be at least 4 mast trees per acre with all being> 6 in. dbh, as well as full-crowned and vigorous.
d. Species to be released in this practice include smooth-barked beech, oak, white or yellow birch, wild apple, wild crabapple, mountain ash, serviceberry/ shadbush, cherry, ash, chestnut, and butternut.

*Timber Objective*

a. High-value commercial species.
b. Crown position in or expected to grow into the main canopy.
c. High-quality tree with:
    a. Butt log with sawlog or higher grade potential.
    b. No sprouts on butt log.
    c. Lean < 22.5 degrees (40%), No Sweep, crooks, forks, rot or other defects

*Aesthetic Objective*

a. Select trees and species that are unique in appearance or character, produce attractive flowers and colorful foliage, and have attractive or unique bark.
b. Visible from travel lanes, vantage points, etc.
c. Aesthetic crop trees can't be more than 25% of total crop trees released.

Crop trees will be released on 3-4 sides of the crown by killing or cutting competing trees with crowns within 5 feet of the crown of the crop trees through felling, complete double girdling, or similar treatment. Competing trees on the West and South sides of the crop tree should be given priority for removal.

At least 20 crop trees per acre will be released. The maximum number of crop trees is as follows:

a. 80 trees per acre in hardwood stands
b. 120 trees per acre in mixedwood stands
c. 150 trees per acre in white pine or softwood stands.

In addition, overall stocking of the stand will be maintained so that a well-distributed, well-stocked stand remains.