

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION**

FOREST STAND IMPROVEMENT

(Ac.)

CODE 666

Specifications that apply to all treatments:

All forest harvests and stem removal treatments (thinning) will be prescribed and applied under the following conditions:

1. Land being maintained in forest, wildlife or natural area will include documentation that defines/ identifies:
 - a. The silvicultural system being followed.
 - b. Short and long term goals and/ or expectations
 - c. The treatment/regeneration process being prescribed.
 - d. Planned subsequent treatments and regeneration activities that will follow.
2. Harvest/thinning areas 10 acres and greater will have a reforestation or regeneration plan as part of the silvicultural prescription.
3. Harvest/thinning areas 40 acres and greater a minimum of 3 snag trees per acre will be retained as well as 3 live cull trees per acre where they are available for retention.
4. Harvest/thinning areas greater than 40 acres will not have greater than 14% roads, landings or disturbed areas not retained in forest cover.
5. All harvest/thinning will meet the Alaska Forest Resources Practices Act (FRPA) provisions and will meet silvicultural prescriptions specifications.
6. Forest conditions necessary to maintain habitat features will be retained where T&E, state designated rare or declining wildlife species are recognized likely or present on the site. Treatment specifications will

identify all necessary parameters to address this resource concern.

7. Forest harvest trails, roads and landings will be designed to NRCS Standards and Specifications and meet AK-FRPA provisions.

Specifications that apply to thinning:

Thinning for this specification is defined as the removal of trees within a stand for the purpose of shifting growth potential to remaining trees.

Commercial / Precommercial

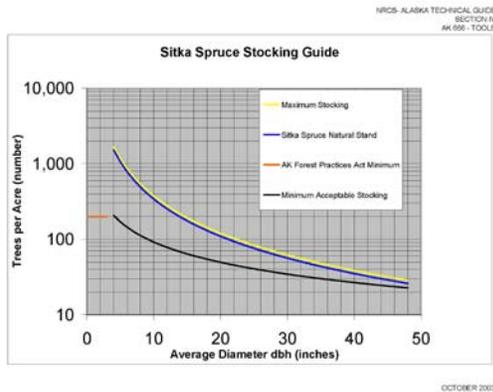
Thinning will categorized as being either commercial or precommercial. The definition of commercial is where a treatment will result in net financial return. Marketability may be based on size, volume or quality of the material removed and local market conditions.

Precommercial and commercial thinning will only be prescribed and applied under the following conditions.

1. Stand is fully or over stocked based on Alaska Forest Stand Stocking Guides. (Fully stocked is defined as within 20% of the maximum stocking for that size (dbh) forest), and.

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2. Stand size and structure is being modified to:
 - a. regulate age distribution to fit the selected silvicultural system
 - b. change species composition as part of landowner objective or as a precursor to a future silvicultural treatment
 - c. improve stand quality, reduce insect and disease risk, and reduce hazardous fuels where there is both a high risk of wildland fire and a threat to life and property
 - d. remove forest products where stocking is nearing the fully stock level and there is a demand for products or an opportunity for economic gain

2. Stand will not be thinned below minimum stocking levels without an acceptable silvicultural justification. (e.g. Shifting from a birch dominated forest to a spruce forest in anticipation of a seed tree harvest in the future)

Types of thinning

Cleaning- removal of unwanted species or lesser quality stems

Thinning from below – removal of suppressed, intermediate or co dominate trees, leaving a stand of dominate stems.

Thinning from above – removal of dominate or co-dominate trees leaving the understory as the principal or dominate strata in the forest community.

Specifications that apply to harvest

The removal of trees from a stand where the final stocking rate will be below the minimum

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stocking level as found in the Alaska forest stocking guide for the residual trees left on site, and the intent is to establish conditions to regenerate the forest through one of the following silvicultural systems.

Silvicultural System (Harvests System) Harvest Specifications

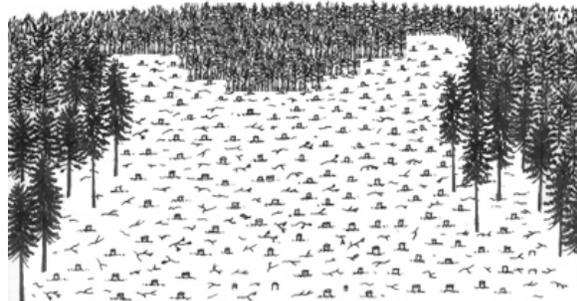
Salvage Harvest – Hazardous Fuel Harvest

The removal of 80% or more of all trees in the main canopy as a means to reduce the natural or economic risk associated with a forest stand that is dead or dying.

All salvage harvest will be prescribed and applied under the following conditions.

1. Threat will be documented.
2. Restocking/reforestation alternatives will be developed with the landowner.
3. Harvest conducted 5 years after death of seed trees will not use the forest soil seed bank as a reforestation source in white spruce stands and 1 year in birch stands.
4. Salvage harvest areas will not be greater than 100 acres without wildlife travel corridors or leave strips.

Clear Cut- (Liquidation, Regeneration harvest, removing all overstory, mid-story and/or understory trees to release advanced regeneration or spur the germination of a seed source.)

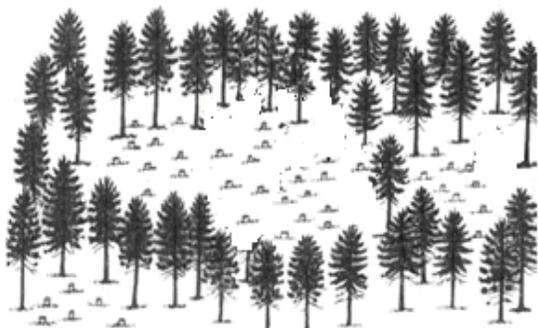


All "Clearcuts" will be prescribed and applied under the following conditions.

1. Clearcut areas will not exceed 100 acres without wildlife travel corridors or leave strips left in place for white spruce stands.

2. Clearcut areas will not exceed 50 acres in size for White Birch stands without wildlife travel corridors or leave strips left in place. If forest regeneration is achieved by planting then 100 acres will be the maximum with corridors or leave strips.
3. On the landscape level (1000 +ac.) clearcuts of less than 20 years in age will not exceed 50% of total area.
4. All clearcuts will either have adequate pre- and post harvest regeneration to constitute a fully stocked stand or it will be accompanied with a restocking prescription.

Patch Cuts or Strip Cuts – Clearcutting strips, patches or gaps to take advantage neighboring seed trees and sheltering conditions from neighboring stands



White Spruce - Strips or patches will be between 200 and 400 feet wide and 2 to 10 years between removals of adjoining strips.

White Birch - Strips or patches will be no wider than 100 feet with adjoining strips removed in two years to provide conditions that favor birch over spruce in the removed areas. Leave strips remaining beyond 2 years, shall be between 350 and 700 feet in width, to provide climatic conditions that favor white birch.

Longer retention periods benefit wildlife more than shorter periods and should be employed when managing for wildlife as primary or secondary objective.

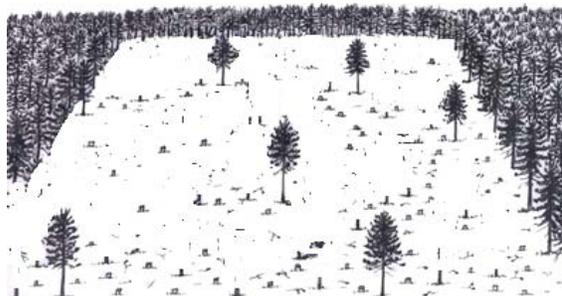
Shelterwood Regeneration System (removal of a portion of the overstory in order to create climatic conditions that favor species regeneration and early development)



White Birch Stands- Remove up to 60 percent of the overstory leaving 4 to 5 Birch seed trees per acre. This method is used to regenerate birch stands where intolerant species such as cottonwood and aspen are a competitor and there is a desire to have birch become the primary cohort of the stand. This method is not to be used where spruce is a competitor.

White Spruce Stands - Remove 1/3 to 1/2 the basal area. More will place the stand at risk for environmental damage. Remove the remaining stems/trees after regeneration is established. Time is not a factor in removing residuals since spruce has a moderate tolerance to shade a young ages.

Seed Tree Regeneration System (removing all but a few trees per acre to serve as a seed source for restocking of the area.)



White Birch stands – Leave 3 to 4 trees per acre that are well distributed. Birch seed trees should never be further than 700 feet from the area in need of natural seeding. Distance may be increased or decrease based on location of seed tree source, wind patterns, slope and elevation (See Retention System below).

White Spruce stands – Spruce trees are typically not wind tolerant when left isolated individually or in very small groups. This technique is to be

avoided in most cases. Larger groups of trees can be left as a seed source. Groups of trees will be based on local wind and soil conditions but will often need to exceed the height canopy as a minimum diameter. Distance from live spruce seed source trees will not exceed 400 feet from the area in need of natural seeding. Distance may be increased or decrease based on location of seed tree source, wind patterns, slope and elevation (See Retention System below).

Retention System: Retaining individual trees, patches, groups of trees for long periods of time. (Often times one commercial harvest cycle)

Minimum size of the retained areas will be 1.5 times the canopy height in both width and length.

Distance between retained areas will follow the 400 foot spruce or the 700 foot birch distances for seed trees. Unless a viable soil seed bank is available for spruce.

Retention Systems can be hybridized with other systems, where the characteristics of the forest species allow for retention. e.g., Seed Tree Retention. This would be where seed trees are left in place and never removed.

Coppice System: Harvesting all or a portion of the trees in a forest with the intent of regenerating the forest by root suckers, and stump sprouts.

This system is applicable to Aspen, Cottonwood and somewhat to Birch species. (Birch will stump sprout but quality and survivability of developing stems maybe in question if lumber is desired)

Coppice harvests will take place in the fall, winter and spring months.

Harvest will not occur from the time of bud break to early September.

Harvest will remove more than 60% of the forest overstory in order to favor rapid development of Aspen and Cottonwood.

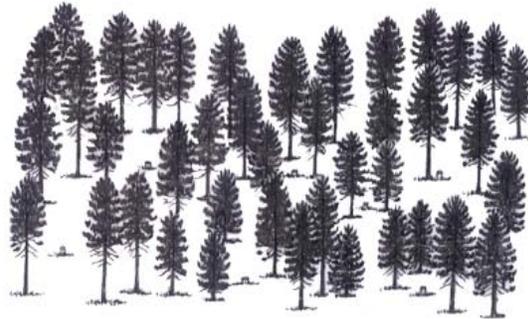
Remove less than 60% of the forest overstory in order to favor Birch stump sprouts. (not the best method to regenerate Birch)

Selection System (uneven aged

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management) Removing some of the trees in a forest, where the goal is a varyingly aged forest. This system allows for continuous removal of trees without a defined harvest rotation.



This system is only applicable in Alaska for white spruce and possibly Western Hemlock under special management conditions. This allows periodic removal on a 20 to 30 year cycle.

Size distribution target for uneven age Spruce management in interior Alaska.

DBH Inches	# of tree per ac.	Basal Area sq ft.per ac.
1	122	1
2	96	2
3	74	4
4	57	5
5	44	6
6	33	7
7	26	7
8	20	7
9	16	7
10	12	6
11	9	6
12	7	6
13	5	5
14	4	4
15	3	4
16	2	3

Total 530 80

Average dbh = 4 inches

This tree distribution is established and developed over a number of selective harvests.

Operation and Maintenance

The Forest Stand Improvement Job sheet will be utilized in documenting specifications

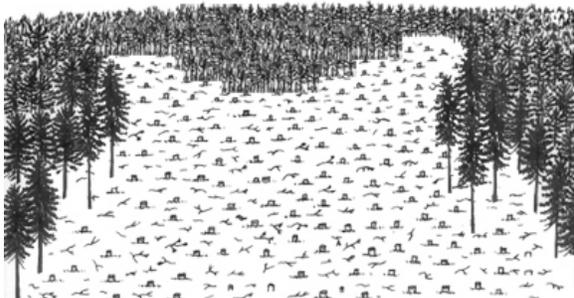
Specific areas of treatment will be documented on a map with treatment years. Each year's treatment will be identified as a separate treatment area or event.

Periodic review of the forest stand conditions will occur through out the life of the practice, (10 years).

Winds throw insect and disease presence, tree mortality and regeneration establishment will be evaluated.

Appendix A Silvicultural Systems

Clear cut: This system is characterized as the removal of all of the overstory trees for either the release of the understory or to allow natural regeneration or reforestation to occur. Critical to this system is the ability of the forest to regenerate by presence of a viable seed source either present in the forest floor or available from adjoining stands of trees, existing advanced regeneration or from tree planting. This system results in an even aged forest most often composed of shade intolerant and shade moderate species. Clear cut is system that is generally applied to areas greater than 5 acres



Variations to the clear cut are **strip cuts** and **block cuts**. These versions of clear cuts are progressive or successive clear cuts that occur over a short period of time. Strip or Blocks of trees are left in place to: meet seeding, wildlife or esthetic requirements. Eventually all the leave strips or blocks are harvested. The blocks or strips can be harvested shortly after adjoining areas making them part of a large management unit with insignificant age differences. The strips and blocks can also be managed as different management units. Strips or blocks left in this variation have the same management goals as

the harvest areas.



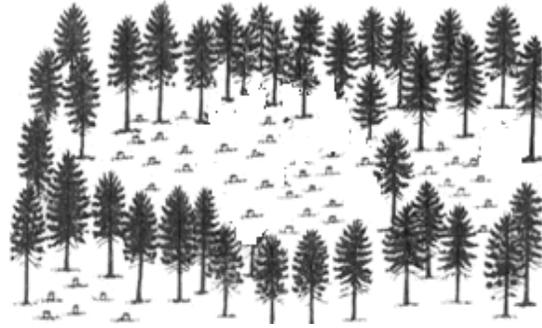
Seed Tree: This system is essentially the same as a clear cut but selected trees are chose to remain as a source of seed. This selection can be used to direct regeneration to a particular species or phenotype. The trees can be removed or left standing after regeneration objectives are met.



Variation of this system is the **Seed Tree Reserve**. This system leaves groups of trees or uncut areas that are used as a seed source and for other considerations such as wildlife or water quality. The term reserve implies that these areas are being left for the entire rotation of the adjoining harvested areas. During the following rotation these can be again reserved, harvested and replaced by a different group of trees to serve as the next reserve group/area.

Shelter wood: As implied by the name, this system utilizes residual trees as a protective shelter for developing regeneration as well as a source for seed. A series of harvest, sometimes as many as 5 entries to the forest are used to manipulate the composition of the regenerating trees. These harvests may include: Preparatory harvest that removes unwanted species or phenotypes; regeneration harvest that prepares the soil and light conditions for regeneration to occur; followed by one or more removal harvest to remove the seeding and shelter overstory trees.

maintenance activities.



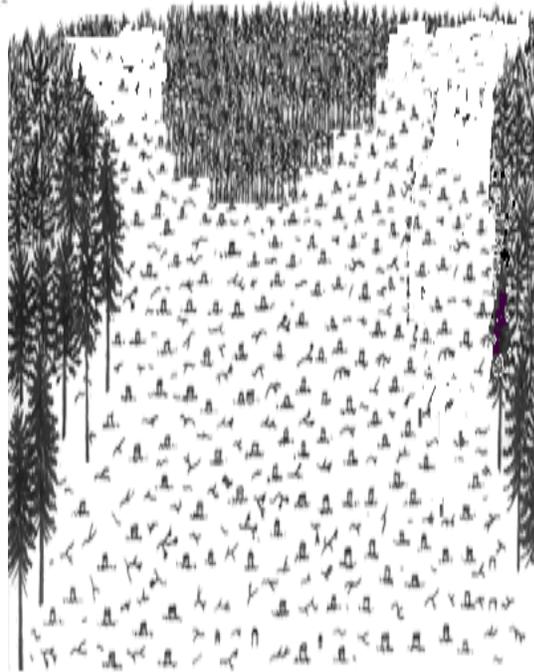
Retention: This harvest system is based on what is left or retained after the harvest is completed. The goal of this system is the harvest of trees while maintaining the structure of the forest for varied reasons, mostly related to maintaining late successional habitat. Areas harvested rarely exceed more than twice the tree height and typically there is a 1 to 1 ratio of harvest to unharvested areas. These retained areas are maintained for the entire crop rotation.

This system results in an even aged homogenous forest that be have further maintenance operation conducted during its development

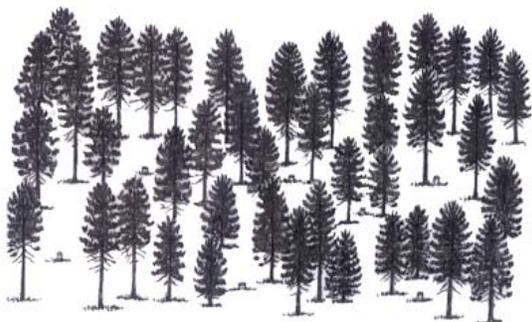
As the trees develop, grow in size, the danger of damaging the regeneration. Residual trees are always present and this should be consider in the timing of the entries into the forest

Coppice: Similar to a clear cut this system is the removal of the overstory canopy with the intent to regenerate the forest by root and stump sprouts. This system is employed in forest where the species have the capacity to regenerate vegetatively.

Patch Cut: Again very similar to clear cut, this system creates harvest units of less than 4 acres and maintain other unharvested patches of similar sizes. The end result is a mosaic of 2 or more patches of forest of distinct age groups, all of which are managed identically except for the periods of harvest and periodic stand



Selection: Of all the systems discussed this is the only type of management that maintains forest tree communities in an uneven age state. Previous systems result in trees of similar age or groups of similar age. Selection system result in a true all age forest and is common in areas where shade tolerant species are desired. Harvests occur at times when trees meet the desired objectives and regeneration occurs continually.



This is the most complex of systems to manage for since older larger trees require greater growing space while small trees are more numerous in number but require either removal by natural selection or by harvest to maintain maximum growth and yield. This type of forest often produces the maximum number of benefits with continual extraction of forest products at a high cost per unit extracted. This is typically used where the products harvested are of high value or the benefits of uneven age management are greater than the harvest benefits.

References

Silvicultural Guide for Paper Birch in the Northeast (revised) L.O. Safford, Research Paper NE-535, 1983, publication #5086

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A Silvicultural Guide for Spruce-Fir in the Northeast, Robert M. Frank & John c. Bjorkbom, USDA Forest Service General Technical Report NE-6, 1973.

The Selection System of Siviculture in Spruce-Fir Stands – Procedures, Early Results and comparisons with Unmanaged Stands. Forest Service Research Paper NE-425.