

**NATURAL RESOURCES CONSERVATION SERVICE
NEVADA CONSERVATION PRACTICE SPECIFICATION**

FOREST STAND IMPROVEMENT

(Acre)

CODE 666

I. SCOPE

The scope of the work shall consist of furnishing labor and equipment to improve the forest stand as delineated in the conservation plan.

II. GENERAL

Document pre-treatment stand composition(s) including species, age classes, stocking, advanced regeneration and understory community. Form ECS-005 *Soil-Woodland Correlation Field Data Sheet* will be used in conjunction with the zigzag transect method. Forest resources should be stratified by aerial photo interpretation into homogenous stands and each stand sampled for meaningful results.

Determine and document suitability of soils for the planned treatment. Refer to Table 2 - Soil Rating Criteria for Harvest Equipment Operability in conjunction with the soil survey of the treatment area and the results of on-site investigation(s).

Determine and mark trees to be cut.

No tree shall be felled unless a way exists or can be created to fell and extract it without causing excessive damage to the residual stand.

III. SILVICULTURAL METHODS

Woodland Weeding. The removal of all plants competing with the crop species regardless of crown position.

Slashing. May be cheapest and most desirable when weed trees or brush are scattered and are of a non-spouting variety.

Girdling. Cheapest and most desirable when weed trees are large and have no commercial value.

Chemical Treatment. Desirable when the weed trees are large, or for kinds that sprout from the stump, such as White fir. When using chemicals, consult manufacturer's specifications for dosage, time of application, etc.

- Aerial spraying is economical only when large areas must be covered. Hand spray small local areas or as clean up on larger spray jobs to kill weed species not affected by original spray. Ground rigs may be used where terrain permits.

Harvesting. Harvest weed trees whenever possible, if market returns are sufficient to cover the cost of harvesting.

Pile and burn heavy concentrations of slash (refer to standards and specifications for PRESCRIBED BURNING (Code 338)); otherwise lop and scatter. Follow provisions of state laws when applicable.

Follow-up original weeding method once each year to determine results and recovery of released trees.

Woodland Intermediate Cutting. The cutting and removal of trees in a young growth timber stand to accelerate diameter increment on residual trees, promote quality timber growth, improve species composition, or recover and use timber that would otherwise be lost to mortality.

When planning for the final harvest cut, leave approximately 50 to 100 trees depending on the site quality, to be grown to economic maturity, well spaced over an acre, from the largest and best trees of the stand. If intensive management has been practiced

previously, the crop trees will have been pruned.

In developing the intermediate cuts before the final harvest cut, use a spacing guide which leaves a varying number of trees, depending upon site indices and average diameter class. Use spacing tables, giving average spacing in feet between leave trees, or a (D + X) spacing guide where this information is available.

Soil compaction should be considered in the design of the transportation and harvesting system. Planners will plan and apply FOREST HARVEST TRAILS & LANDINGS (Code 655) as part of the overall conservation plan.

Thin Site classes I, II, and III in priority. Unless thinning is done to improve forage for grazing, it is not economical to think Site Classes IV and V.

Remove all poorly formed, suppressed, diseased, and injured trees in the initial thinning.

Stocking standards as described in the forest practice rules must be met immediately after the thinning operation.

Ponderosa Pine and Associated Species

Start thinning operations in ponderosa pine at 15 to 20 years of age. Frequent (every 5 to 10 years), light thinnings are best but need to be weighted against their cost. Thinning intensity should consider the minimum sized merchantable products.

The spacing distance between leave trees is based upon maintaining a level of basal area that will reduce competition until the stand reaches merchantable size. Several different methods can be used to do this.

- Cut a pole the length of the spacing desired, and use this as the spacing distance between the leave trees. This is a particularly good method in young stands where the trees have not expressed dominance.
- Use a standard D+ factor, where "D" is the diameter in inches changed to feet, plus the standard factor. Example: Diameter is 2 inches. 2 feet + 6 feet = 8 foot spacing distance. For Ponderosa pine, use D+6. For ponderosa pine heavily

mixed with associated species, uses D+5. For pure stands of lodgepole pine, use D+6.

- Spacing by a calculated and tabulated guide, based upon Site index.

Regardless of method, favor leave trees of superior form and vigor, rather than trying to achieve exact spacing.

See Table 1 for recommended thinning spacing by site index for ponderosa pine.

In some areas, ponderosa pine and its associated species can sometimes be sold as poles, piling, firewood, and Christmas trees. Where this is the case, thinning can begin at or before the time the trees reach the size of the merchantable product.

Aspen

In aspen stands, make a precommercial thinning at about age 15 to improve spacing. The little work that has been done indicates that aspen need to be thinned at a very early age if there is to be any stimulated growth from the remaining stems. Suppressed aspen trees do not recover very well when released to additional light.

Thin to a spacing of approximately 8 x 8 feet between leave trees at about age 15 if only one thinning is contemplated.

Thinning twice during the rotation may yield better results. Thin to a spacing of about 5 x 5 feet at about age 5 - 10. Subsequently, thin once more when the dominants and codominants have reached about 35 feet, to an irregular spacing of 15 x 15 feet.

Juniper

Thin only the reproduction and immature trees.

Space the leave trees to an average of D+15 (the average diameter in inches of a one-foot stump changed to feet, plus 15 feet). Example: 3 inch diameter stump at one foot height = 3 feet plus 15 feet = 18 foot spacing.

- Remove the multiple-sprout trees.
- Favor retaining the single-stemmed tree that will make a post.

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- Remove the injured, crooked, and deformed trees.

Pinyon Pine

Thin to an average 10x10 foot spacing between leave trees.

Thin gradually and frequently so as to save all trees that have potential value as Christmas trees.

Remove the injured, crooked, and deformed trees.

Remove the competing juniper except where no Pinyon pine occupies the space and the juniper will make a post.

Other Conifers:

Use following thinning guides for other conifers:

- Carry out periodic commercial thinning operations at 5 to 10 year cutting cycles until the final harvest cut is made, where topography permits.
- The cutting cycle can be varied slightly to suit the needs and desires of the landowner and to coincide with favorable markers.
- Use D+X or a similar spacing guide when known for each species and site quality class.

Woodland Harvest Cutting

Ponderosa pine and associated species (sugar pine, Jeffrey pin, Douglas fir, and incense-cedar):

Clear-cut groups or patches. Patches should be variable in size and irregular in shape to simulate natural openings and minimize contrast with the natural landscape. Patches shall be sized such that no area is more than 660 feet from a seed source unless the area is adequately stocked. No clear-cut area may exceed 40 acres. No clear-cut shall be contiguous with another clear-cut area in the same ownership until the area is revegetated.

Adequate stocking as defined by the Nevada Forest Practice Act is one, or a combination of, the following conditions:

Density (Stems/Acre)	Size (DBH)
420	<4
150	4-6
75	8-10'
40	>12

Seed tree. This method provides for the harvest of the timber in one cut except for the seed trees to be left to restock the logged area. An average of at least 10 seed trees, 18 inches d.b.h. (diameter breast height) or greater per acre must remain. No point within the logged area shall be more than 660 feet from the nearest seed tree as measured along the surface of the ground unless the area is adequately stocked.

Seed trees should be thrifty, well formed, disease free trees. Ponderosa, Jeffrey, or sugar pine are those species normally retained as seed trees.

Ponderosa seed trees shall meet Dunning's tree classification 1 or 2, or Keene's tree classes 1A, 1B, 2A, or 2B.

Selection Method. This method provides for harvest of timber, covering a variety of age classes, either as single scattered trees or in small groups at relatively short intervals, commonly 5 to 20 years, repeated indefinitely.

Continuous establishment by natural reproduction is encouraged and an unevenaged stand is maintained.

Sanitation - salvage. This method provides for the harvest of only those trees which are dead, dying, or deteriorating because of material damage from fire, wind, insects, disease, flood, or other injuring agents.

Mixed stands (predominately white and red fir):

Shelterwood. This method provides for at least a two-stage harvest that will encourage natural regeneration of desired species. Stocking immediately following harvesting must equal or exceed that set forth in the

stocking standards as specified in the Nevada Laws on Forestry and Fire.

Lodgepole pine:

Clear-cut groups or patches. Patches should be variable in size and irregular in shape to simulate natural openings and minimize contrast with the natural landscape. Patches shall be sized such that no area is more than 660 feet from a seed source unless the area is adequately stocked.

Slash piling and burning shall be delayed until sufficient lodgepole cones have opened to assure adequate stocking.

Juniper:

Recent invasion areas. If an area is to be used for both forage and juniper post production, harvest overmature, deformed, crooked, forked, and diseased trees. Leave single-stemmed trees that will produce a post, spaced about 25 feet apart.

Transition areas. Harvest all overmature and mature trees for post and fuelwood. Cut all standing cull trees. In some areas, pinyon is an associated species.

Steep rocky slopes. These stands generally occupy very fragile sites and any management should be done with extreme care.

Pinyon pine

Can be managed for pinyon nuts. Harvest overmature and mature pinyon and generally all junipers, and manage for Christmas trees. About 6 well-spaced pinyon pine seed trees per acre are necessary for an adequate seed source.

Aspen

Clear-cut. If the same species are desired in the new stand, nothing needs to be done but to culture the sprouts and defer grazing. If different species are desired, plant immediately and treat the stumps with a proper herbicide.

IV. LOGGING PRACTICES

Logging practices shall be conducted to avoid unnecessary damage to residual trees, advanced reproduction, riparian vegetation and water quality.

Stump height shall be 12 inches or less on its uphill side.

Tractor logging shall not be conducted on sites having average slopes in excess of 30%.

Cable yarding rigging shall not be hung from residual trees unless they are protected from damage.

State of Nevada. 1994. Nevada Laws on Forestry and Fire. West Publishing Co.

State of Nevada. 1994. Handbook of Best Management Practices, Appendix H-1, Amended Forest Practice Rules.

IV. OPERATION AND MAINTENANCE

Operation and maintenance requirements are not applicable for this practice.

REFERENCES

Cooperative Extension, University of California 1982. Management of the Eastside Pine Type in Northeastern California - Proceedings of a Symposium. Northern California Society of American Foresters, Arcata, CA.

DeBoyle, N.V. and R.P. Winokur, editors. 1985. Aspen Ecology and Management in the Western United States. USDA Forest Service General Technical Report RM-119, 283 p. Rocky Mountain Forest and Range Experiment Station, Ft. Collins, CO.

Lotan, J.E, Critchfield, W.B., comp. Silvics of North America, Volume I, Conifers. Agricultural Handbook 654. Washington DC. US Department of Agriculture, Forest Service.

Natural Resources Conservation Service. 1996. National Forestry Manual, Title 190 - Review Draft. (Washington, DC, US Government Printing Office, December, 1996).

Pritchell, W. L. 1979. Properties and Management of Forest Soils. John Wiley & Sons, Inc., New York.

Sierra Nevada Ecosystem Project, Final Report to Congress, vol. II, Assessments and Scientific Basis for Management Options (Davis: University of California, Centers for Water and Wildland Resources, 1996).

Smith, D.M., Hawley, R.C., 1962. The Practice of Silviculture. John Wiley & Sons, Inc., New York.

Table 1 Thinning Guide for Ponderosa Pine

Site Index	No. of Trees Per Acre to Leave at Any Age Up to 10" DBH	Average Spacing Distance Between Leave Trees (Feet)	Space Per Tree Remaining (Sq. Feet)
60	212	14	205
70	236	14	184
80	260	13	168
90	304	12	143
100	328	12	133
110	351	11	125
120	374	11	117

When using this guide for associated species of Ponderosa pine, use an average spacing distance between trees of one foot less.

PLANNING GUIDE-MANAGED PONDEROSA PINE

Site Index	60	80	100	120	140
Spacing Feet*	D+9	D+8	D+7	D+6	D+5
Thinning Cycle - years	10	8	7	6	4
Rotation for 12" Trees - years	60	48	42	36	24
Rotation for 16" Trees - years	80	64	56	48	32

* Add 1 or 2 feet for woodland grazing.

Table 2 - Soil Rating Criteria for Harvest Equipment Operability.

FACTOR	WELL SUITED	MODERATELY SUITED	POORLY SUITED	FEATURE	IMPACT
Slope %	<20%	20-35%	>35%	Slope	Reduced efficiency; unsafe operation
Rock Fragments On the surface				Stoniness	Obstruction
≥3"	<15%	15-50%	>50%		
>10"	<3%	3-15%	>15%		
>24"	<0.1%	0.1-3%	>3%		
Plasticity Index Highest value for uppermost thickest mineral horizon in the upper 6"	<30	≥30	---	Stickiness	Reduced efficiency
Particle Size Separates ≥3" thickness in the upper 6"	<85% coarser than vfs	≥85% coarser than vfs	---	Too sandy	Reduced efficiency
Unified Classification Group ≥3" thickness in the upper 6"	---	CL, CH, CL-CH, ML, MH, ML-MH	OL, OH, PT	Low strength	Reduced efficiency
Water Table Depth Year-round	>24"	12-24"	<12"	Wetness	Reduced efficiency
Ponding			Year round		

Description

The suitability for operating harvesting equipment.

Considerations**Ratings assess:**

- The off-road transport or harvest of logs and/or wood products by ground-based wheeled or tracked equipment.
- The use of standard rubber-tire skidders and bulldozers used for ground-based harvesting and transport.
- Activities that disturb from 35 to 75% of the surface area with rutting, puddling or displacement up to a depth of 18".
- Year-round water tables and year-round ponding.

Rating assume:

- Activities occur during customary periods of such work for the local area.

Ratings do not assess:

- Non-soil obstacles, e.g., slash
- Frozen or snow-covered soils.

Ratings:

Well Suited - Little or no restrictions to equipment operability.

Moderately Suited - One or more restrictions reduce the effective and safe use of equipment.

Poorly Suited - One or more restrictions make the use of equipment impractical or unsafe.

