

A Publication of the
**National Wildfire
Coordinating Group**

Sponsored by
United States
Department of Agriculture

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Department of the Interior

National Association of
State Foresters

PHOTO SERIES FOR
QUANTIFYING FOREST RESIDUES IN THE:

**COASTAL DOUGLAS-FIR-HEMLOCK TYPE
COASTAL DOUGLAS-FIR-HARDWOOD TYPE**



**PMS 819
NFES 1870**

1976

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Order NFES # 1870

LIST OF PLANT SPECIES CITED

cherry *Prunus* spp.
chinkapin *Castanopsis* spp.
Douglas-fir *Pseudotsuga menziesii* (Mirb.) Franco
lodgepole pine *Pinus contorta* Dougl.
madrone *Arbutus* spp.
ponderosa pine *Pinus ponderosa* Laws.
Port-Orford-cedar *Chamaecyparis lawsoniana* (A. Murr.) Parl.
red fir *Abies* spp.
tanoak *Lithocarpus densiflorus* (Hook. & Arn.) Rehd.
vine maple *Acer circinatum* Pursh
western hemlock *Tsuga heterophylla* (Raf.) Sarg.
western redcedar *Thuja plicata* Donn
western white pine *Pinus monticola* Dougl.
white fir *Abies concolor* (Gord. & Glend.) Lindl.

METRIC CONVERSIONS

1 acre = 0.4047 hectare
2.471 acres = 1 hectare
1 cubic foot = 0.02832 cubic meter
35.31 cubic feet = 1 cubic meter
1 foot = 0.3048 meter
3.281 feet = 1 meter
1 inch = 2.54 centimeters
0.3937 inch = 1 centimeter
1 ton (short) = 0.907 ton (metric)
1.102 tons (short) = 1 ton (metric)

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WHAT ARE THESE PHOTO SERIES?

These photo series are arrays of photos, with each array showing different residue loading levels generated from like timber types and cutting practices. Each photo is supplemented with information which includes:

- Measured quantities by size classes, average depth, ground area covered, and other residue data.
- Harvesting or thinning information.
- Fuel ratings.

Thus, the series provide a basis for quantifying and describing existing and expected residue loadings on other areas and serve as a communication link between users.

WHY ARE THEY NEEDED?

Timber harvesting, silvicultural practices, and land clearing operations generate forest residues on nearly 1.5 million acres annually in Washington and Oregon; the trend toward more partial cutting and less clearcutting will increase acres cutover in subsequent years if the volume cut remains constant.

Although some residues are beneficial for such purposes as nutrient cycling, soil protection, wildlife cover, and microclimate effect, excessive residues adversely affect the forest environment in many ways. Much of the forest contains residues in undetermined but excessive quantities from the standpoints of resource use, protection, and management. To reduce residues to a level considered desirable, estimates are needed on quantities that now exist or will be created by some activity.

Inventory techniques, such as the planar intersect method, are very useful when a high degree of accuracy is needed but are time consuming and costly to apply extensively. Photo series can be used to make fast, easy, and inexpensive quantifications of residue, adequate for most management needs.

There has been no way for all resource disciplines to become readily familiar with residue volumes and descriptions so that they can make quantitative inputs to residue management. Likewise, because fuel rating systems are specialized and subjective, they too are not readily adapted to other environmental components. These deficiencies can be overcome with the photo series.

HOW CAN THEY BE USED?

Inventory of Down Residue

Loadings in various residue size classes, average residue depth, and ground area covered are characteristics that are visible in the photographs; hence, users can

estimate any of these characteristics on an area being inventoried by comparing them with the photos as follows:

1. Observe each characteristic of the residue on the ground (e. g., 3.1- to 9-inch loading).
2. Select a photo which nearly matches, or photos that bracket, the observed characteristic.
3. Obtain the quantitative value for the characteristic being estimated from the data sheet accompanying the selected photo (or interpolate a value between photos).

These steps are repeated for each characteristic desired. If the general area being inventoried has zones of obvious differences in residue loading, the user should consider making separate determinations for each zone, which can then be weighted and cumulated for the whole area.

Residue characteristics not distinguishable in the photographs are duff and litter depth, proportion of sound residue by species, and proportion rotted. If values for these characteristics are desired in an inventory, they must be derived from independent sampling or observations.

Inventory information can be used by land managers to (1) evaluate impacts residues have on various aspects of forest management, (2) identify areas of unacceptable residue loading, (3) identify priority areas for treatment, (4) estimate amount of utilizable material, and (5) predict fire behavior characteristics.

Determination of Desired Residue Level

Land management objectives can be more nearly achieved if a team of appropriate specialists can participate in specifying residues which should remain on site after completion of a cutting activity. Individuals helping with these determinations can study the photo series to recognize the appearance of various quantities and distributions of residue. With this knowledge, each individual can describe in quantitative terms the residue he believes should be retained to meet environmental concerns and goals of his particular specialty. The group can then use the photo series as a communication tool to resolve differences in arriving at a desired level.

After treatment, the degree to which objectives were achieved can be judged by comparing observed posttreatment loading with the desired level description.

Prediction of Residues From Planned Cutting and Residue Changes From Treatments

Photo series are a rudimentary aid for predicting amounts of residue from cutting and residue changes from treatments. Many factors, such as condition of timber stand, topography, logging method, and utilization intensity, affect the volume of resulting residues, so users should bear in mind that these series depict only a few of the possible combinations.

To predict residue volumes from planned cutting, the user compares timber volume and size information from cutting plans with this kind of information in the

photo series. Selecting a photo series level or levels with similar stand characteristics, the user refers to data sheet loadings, considers factors which differ from the photo series situations, and quantifies the loading expected.

Predicted loadings can be used to support changes in cutting and removal actions and to plan appropriate treatments.

To predict residue changes from treatments, the user studies the treated and untreated levels in the photo series to gain knowledge of relative changes or reductions affected by sample treatments. Then, comparing residue inventory or preharvest prediction information with levels in the series, the user determines the change a specific treatment may produce.

Predicted change in residue from treatments can aid in (1) identifying treatments that will reduce residues to the desired level, (2) selecting the most cost-effective treatments, and (3) estimating tons that will be consumed by fire. Improved accuracy in estimating tons consumed by fire will increase reliability of particulate and chemical compound emission calculations.

HOW WERE THEY DEVELOPED?

Areas photographed for these series were selected to show typical residue loading variations resulting from commonly applied harvest and cultural practices in major vegetative types of the coastal Pacific Northwest. Photos were taken and data

collected as follows:

1. Areas were photographed and the material in the photo area sampled in accordance with U. S. Forest Service national guidelines.¹
2. Measurement technique was in accordance with the "Handbook for Inventorying Downed Woody Material."²
3. Timber stand, logging, and residue treatment information was obtained from timber sale or project records in field offices.
4. Forest Service Region 6 fuel types were assigned by a panel of Forest Service fuel specialists.³

¹ USDA Forest Service. 1975. National fuel classification and inventory system, preliminary draft. 61 p., illus. Washington Office, Washington, D. C.

² Brown, James K. 1974. Handbook for inventorying downed woody material. USDA For. Serv. Gen. Tech. Rep. INT-16, 24 p., illus. Intermt. For. and Range Exp. Stn., Ogden, Utah.

³ USDA Forest Service Region 6. 1968. Guide for fuel type identification. 48 p., illus. Portland, Oreg.

HOW CAN THEY BE SUPPLEMENTED?

If users in the coastal Pacific Northwest find they have important local residue loadings which are not adequately represented, they can supplement these series or develop additional series by following procedures described in the referenced documents. The series in this publication may be usable, in total or in part, in appropriate vegetative types in other regions.

These series do not show residue loadings in stands undisturbed by cutting activities. Natural residue photo series may be developed in the future to aid in inventorying such areas.

A companion publication, containing photo series for use in ponderosa pine, ponderosa pine and associated species, and lodgepole pine types, will be published by the Pacific Northwest Forest and Range Experiment Station.

HOW ARE LEVELS IN THESE SERIES CODED?

The data for each level are presented on the page facing the photo. Facing picture and data pages have the same code for the residue situation shown. The code shows:

- a. Order of rank from lightest loading to heaviest loading shown in the series of photographs.

b. Forest type, e. g. , DF = Douglas-fir--hemlock, DFHD = Douglas-fir--hardwood.

c. Forest size class, where:

1 = <5-inch d. b. h.

2 = 5- to 11-inch d. b. h.

3 = 12- to 20-inch d. b. h.

4 = >20-inch d. b. h.

d. Cutting practice, where:

CC = clearcut

PC = partial cut (shelterwood, selection, overstory removal)

TH = precommercial thinning

Example: 1-DF-4-CC is the first photo in the series for Douglas-fir--hemlock, >20-inch diameter trees, after harvest by clearcutting.

DOUGLAS-FIR-HEMLOCK

SIZE CLASS 4

CLEARCUT

A SERIES OF 10 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.



1-DF-4-CC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	0.2
0.25-1.0	2.0	114	Ground area covered by residue 1/4-inch diameter and larger	(percent) 52
1.1-3.0	1.5	93	Average duff and litter depth	(inches) 1.9
3.1-9.0	3.6	252	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) 81
9.1-20.0	0	0		white fir (percent) 16
20.1+	0	0		other (percent) 3
Total	7.1	459	Rotted residue 3.1-inch diameter and larger	(percent) 0

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>58</u>	Stems cut/acre _____	U.S. Forest Service Region 6 fuel type identification <u>LL</u>
Net volume cruised (M fbm/acre) <u>54</u>	Stems remaining/acre _____	
Average stems/acre cut <u>55</u>	Basal area/acre before _____	REMARKS
Average d.b.h. of stems cut (inches) <u>24</u>	Basal area/acre after _____	
Stand age (years) <u>200+</u>	Average d.b.h. before (inches) _____	
Cutting prescription <u>Clearcut</u>	Average d.b.h. after (inches) _____	
Yarding method <u>Tractor</u>	Thinning method _____	
Slash treatment <u>Machine piled & burned</u>	Slash treatment _____	
Period since cut or treatment (months) <u>12</u>		



2-DF-4-CC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	Ground area covered by residue 1/4-inch diameter and larger (percent)	Average duff and litter depth (inches)	Sound residue 3.1-inch diameter and larger Douglas-fir (percent)	vine maple (percent)	Rotted residue 3.1-inch diameter and larger (percent)
0.25-1.0	2.4	135	0.3	64	2.3	16	5	79
1.1-3.0	7.5	464						
3.1-9.0	6.6	439						
9.1-20.0	0.7	50						
20.1+	0	0						
Total	17.2	1,088						

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	72	Stems cut/acre		U.S. Forest Service Region 6 fuel type identification LL
Net volume cruised (M fbm/acre)	48	Stems remaining/acre		
Average stems/acre cut	43	Basal area/acre before		REMARKS
Average d.b.h. of stems cut (inches)	30	Basal area/acre after		
Stand age (years)	250+	Average d.b.h. before (inches)		
Cutting prescription	Clearcut	Average d.b.h. after (inches)		
Yarding method	High-lead	Thinning method		
Slash treatment	YUM*	Slash treatment		
Period since cut or treatment (months)	<12			

*Required yarding unmerchantable material (YUM) down to 8 inches in diameter, small end, and 10 feet in length.



4-DF-4-CC

DATE: ET 1964

LOADING			OTHER MEASUREMENTS			
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.9</u>		
0.25-1.0	5.6	374	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>99</u>		
1.1-3.0	7.6	610	Average duff and litter depth	(inches) <u>7.1</u>		
3.1-9.0	7.3	647	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>14</u>		
9.1-20.0	10.7	1,038		<u>western redcedar</u> (percent) <u>6</u>		
20.1+	5.8	615		<u>other</u> (percent) <u>4</u>		
Total	37.0	3,284	Rotted residue 3.1-inch diameter and larger	(percent) <u>76</u>		
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>60</u>	Stems cut/acre	_____	U.S. Forest Service Region 6		
Net volume cruised (M fbm/acre)	<u>29</u>	Stems remaining/acre	_____	fuel type identification <u>MH</u>		
Average stems/acre cut	<u>38</u>	Basal area/acre before	_____	REMARKS		
Average d.b.h. of stems cut (inches)	<u>34</u>	Basal area/acre after	_____			
Stand age (years)	<u>250+</u>	Average d.b.h. before (inches)	_____			
Cutting prescription	<u>Clearcut</u>	Average d.b.h. after (inches)	_____			
Yarding method	<u>High-lead</u>	Thinning method	_____			
Slash treatment	<u>YUM*</u>	Slash treatment	_____			
Period since cut or treatment (months)	<u><12</u>					

*Required yarding unmerchantable material (YUM) down to 8 inches in diameter, small end and 10 feet in length.



5-DF-4-CC

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5-DF-4

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.6</u>
0.25-1.0	2.6	174	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>78</u>
1.1-3.0	4.5	361	Average duff and litter depth	(inches) <u>3.3</u>
3.1-9.0	14.3	1,053	Sound residue 3.1-inch diameter and larger	<u>western hemlock</u> (percent) <u>36</u>
9.1-20.0	15.7	1,069		<u>Douglas-fir</u> (percent) <u>19</u>
20.1+	8.3	573		<u>other</u> (percent) <u>12</u>
Total	45.4	3,230	Rotted residue 3.1-inch diameter and larger	(percent) <u>33</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>84</u>	Stems cut/acre	_____	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre)	<u>57</u>	Stems remaining/acre	_____	fuel type identification <u>HM</u>
Average stems/acre cut	<u>36</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>40</u>	Basal area/acre after	_____	
Stand age (years)	<u>400</u>	Average d.b.h. before (inches)	_____	
Cutting prescription <u>Clearcut</u>		Average d.b.h. after (inches)	_____	
Yarding method <u>High-lead</u>		Thinning method	_____	
Slash treatment <u>YUM*</u>		Slash treatment	_____	
Period since cut or treatment (months)	<u>12</u>			

*Required yarding unmerchantable material (YUM) down to 8 inches in diameter, small end and 10 feet in length.



6-DF-4-CC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)
0.25-1.0	0.5	29	0.3
1.1-3.0	0.4	25	Ground area covered by residue 1/4-inch diameter and larger (percent) 45
3.1-9.0	7.0	514	Average duff and litter depth (inches) 2.1
9.1-20.0	25.1	1,683	Sound residue 3.1-inch diameter and larger Douglas-fir (percent) 45
20.1+	31.0	2,086	western hemlock (percent) 6
Total	64.0	4,337	other (percent) 5
			Rotted residue 3.1-inch diameter and larger (percent) 44

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>93</u>	Stems cut/acre _____	U.S. Forest Service Region 6 fuel type identification <u>LL</u>
Net volume cruised (M fbm/acre) <u>62</u>	Stems remaining/acre _____	
Average stems/acre cut <u>44</u>	Basal area/acre before _____	REMARKS
Average d.b.h. of stems cut (inches) <u>38</u>	Basal area/acre after _____	
Stand age (years) <u>160+</u>	Average d.b.h. before (inches) _____	
Cutting prescription <u>Clearcut</u>	Average d.b.h. after (inches) _____	
Yarding method <u>High-lead</u>	Thinning method _____	
Slash treatment <u>Fall broadcast burn</u>	Slash treatment _____	
Period since cut or treatment (months) <u>12</u>		



7-DF-4-CC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)
0.25-1.0	4.9	279	1.1
1.1-3.0	11.3	696	Ground area covered by residue 1/4-inch diameter and larger (percent) 97
3.1-9.0	22.0	1,526	Average duff and litter depth (inches) 7.9
9.1-20.0	13.9	960	Sound residue 3.1-inch diameter and larger western hemlock (percent) 8
20.1+	45.0	3,005	Douglas-fir (percent) 4
Total	97.1	6,466	Rotted residue 3.1-inch diameter and larger (percent) 88

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>48</u>	Stems cut/acre _____	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre) <u>42</u>	Stems remaining/acre _____	fuel type identification <u>HH</u>
Average stems/acre cut <u>33</u>	Basal area/acre before _____	REMARKS
Average d.b.h. of stems cut (inches) <u>25</u>	Basal area/acre after _____	
Stand age (years) <u>300+</u>	Average d.b.h. before (inches) _____	
Cutting prescription <u>Clearcut</u>	Average d.b.h. after (inches) _____	
Yarding method <u>High-lead</u>	Thinning method _____	
Slash treatment <u>YUM*</u>	Slash treatment _____	
Period since cut or treatment (months) <u><6</u>		

*Required yarding unmerchantable material (YUM) down to 16 inches in diameter, small end and 10 feet in length.



8-DF-4-CC

8-DF-

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	<u>1.0</u>
0.25-1.0	4.3	287	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>92</u>
1.1-3.0	5.9	472	Average duff and litter depth (inches)	<u>6.2</u>
3.1-9.0	16.1	1,147	Sound residue 3.1-inch diameter and larger	<u>21</u>
9.1-20.0	23.2	1,634	western hemlock (percent)	<u>20</u>
20.1+	54.9	3,777	Douglas-fir (percent)	<u>6</u>
Total	104.4	7,317	other (percent)	<u>53</u>
			Rotted residue 3.1-inch diameter and larger (percent)	<u>53</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	
Gross volume cruised (M fbm/acre)	<u>89</u>		Stems cut/acre	_____
Net volume cruised (M fbm/acre)	<u>58</u>		Stems remaining/acre	_____
Average stems/acre cut	<u>44</u>		Basal area/acre before	_____
Average d.b.h. of stems cut (inches)	<u>42</u>		Basal area/acre after	_____
Stand age (years)	<u>350</u>		Average d.b.h. before (inches)	_____
Cutting prescription	<u>Clearcut</u>		Average d.b.h. after (inches)	_____
Yarding method	<u>High-lead</u>		Thinning method	_____
Slash treatment	<u>None</u>		Slash treatment	_____
Period since cut or treatment (months)	<u>1</u>			
			FUEL RATING	
			U.S. Forest Service Region 6 fuel type identification <u>HH</u>	
			REMARKS	



9-DF-4-CC

DATA T due de ptive 9-DF-

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	4.8	275	Average residue depth	(feet) <u>1.4</u>
1.1-3.0	8.4	518	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>100</u>
3.1-9.0	33.8	2,505	Average duff and litter depth	(inches) <u>9.8</u>
9.1-20.0	52.1	3,989	Sound residue 3.1-inch diameter and larger Douglas-fir	(percent) <u>12</u>
20.1+	47.5	3,227	western hemlock	(percent) <u>11</u>
Total	146.6	10,514	other	(percent) <u>10</u>
			Rotted residue 3.1-inch diameter and larger	(percent) <u>67</u>

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>79</u>	Stems cut/acre _____	U.S. Forest Service Region 6 fuel type identification <u>EE</u>
Net volume cruised (M fbm/acre) <u>67</u>	Stems remaining/acre _____	
Average stems/acre cut <u>60</u>	Basal area/acre before _____	REMARKS
Average d.b.h. of stems cut (inches) <u>29</u>	Basal area/acre after _____	
Stand age (years) <u>300+</u>	Average d.b.h. before (inches) _____	
Cutting prescription <u>Clearcut</u>	Average d.b.h. after (inches) _____	
Yarding method <u>High-lead</u>	Thinning method _____	
Slash treatment <u>None</u>	Slash treatment _____	
Period since cut or treatment (months) <u>6</u>		



10-DF-4-CC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	<u>1.2</u>
0.25-1.0	3.6	206	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>88</u>
1.1-3.0	11.0	678	Average duff and litter depth (inches)	<u>8.6</u>
3.1-9.0	18.5	1,348	Sound residue 3.1-inch diameter and larger <u>Douglas-fir</u> (percent)	<u>14</u>
9.1-20.0	30.3	2,152	<u>Pacific silver fir</u> (percent)	<u>2</u>
20.1+	160.0	10,825	(percent)	
Total	223.4	15,209	Rotted residue 3.1-inch diameter and larger (percent)	<u>84</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre)	<u>131</u>		Stems cut/acre	U.S. Forest Service Region 6 fuel type identification <u>HE</u>
Net volume cruised (M fbm/acre)	<u>79</u>		Stems remaining/acre	
Average stems/acre cut	<u>55</u>		Basal area/acre before	REMARKS
Average d.b.h. of stems cut (inches)	<u>32</u>		Basal area/acre after	
Stand age (years)	<u>300+</u>		Average d.b.h. before (inches)	
Cutting prescription <u>Clearcut</u>			Average d.b.h. after (inches)	
Yarding method <u>High-lead</u>			Thinning method	
Slash treatment <u>None</u>			Slash treatment	
Period since cut or treatment (months)	<u>12</u>			

DOUGLAS-FIR—HEMLOCK

SIZE CLASS 4

PARTIAL CUT

A SERIES OF 9 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.



1-DF-4-PC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	1.1	61	Average residue depth	(feet) <u>0.1</u>
1.1-3.0	2.3	143	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>40</u>
3.1-9.0	2.3	174	Average duff and litter depth	(inches) <u>0.7</u>
9.1-20.0	1.0	65	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>79</u>
20.1+	0	0		(percent) _____
Total	6.7	443	Rotted residue 3.1-inch diameter and larger	(percent) <u>21</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>51</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>LL</u>
Net volume cruised (M fbm/acre)	<u>39</u>	Stems remaining/acre	_____	
Average stems/acre cut	<u>52</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>27</u>	Basal area/acre after	_____	
Stand age (years)	<u>300</u>	Average d.b.h. before (inches)	_____	
Cutting prescription	<u>Shelterwood</u>	Average d.b.h. after (inches)	_____	
Yarding method	<u>Tractor</u>	Thinning method	_____	
Slash treatment	<u>Machine piled & burned</u>	Slash treatment	_____	
Period since cut or treatment (months)	<u>12</u>			



2-DF-4-PC

DATA SHEET

Residue descriptive code 2-DF-4-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.5</u>
0.25-1.0	1.9	124	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>76</u>
1.1-3.0	3.6	289	Average duff and litter depth	(inches) <u>1.4</u>
3.1-9.0	6.3	483	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>54</u>
9.1-20.0	8.1	547		<u>western hemlock</u> (percent) <u>21</u>
20.1+	0	0		<u>other</u> (percent) <u>21</u>
Total	19.9	1,443	Rotted residue 3.1-inch diameter and larger	(percent) <u>4</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	
Gross volume cruised (M fbm/acre) <u>26</u>			Stems cut/acre	_____
Net volume cruised (M fbm/acre) <u>21</u>			Stems remaining/acre	_____
Average stems/acre cut <u>52</u>			Basal area/acre before	_____
Average d.b.h. of stems cut (inches) <u>22</u>			Basal area/acre after	_____
Stand age (years) <u>170+</u>			Average d.b.h. before (inches)	_____
Cutting prescription <u>Tree selection</u>			Average d.b.h. after (inches)	_____
Yarding method <u>Tractor</u>			Thinning method	_____
Slash treatment <u>None</u>			Slash treatment	_____
Period since cut or treatment (months) <u><6</u>				
			FUEL RATING	
			U.S. Forest Service Region 6 fuel type identification <u>HH</u>	
			REMARKS	



3-DF-4-PC

DATA T due de rtive / 3-DF-

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	1.6	108	Average residue depth	(feet) <u>0.1</u>
1.1-3.0	2.7	214	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>36</u>
3.1-9.0	5.7	389	Average duff and litter depth	(inches) <u>0.6</u>
9.1-20.0	7.9	534	Sound residue 3.1-inch diameter and larger Douglas-fir	(percent) <u>84</u>
20.1+	3.0	200	western hemlock	(percent) <u>11</u>
Total	20.9	1,445	other	(percent) <u>5</u>
			Rotted residue 3.1-inch diameter and larger	(percent) <u>0</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>43</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>LL</u>	
Net volume cruised (M fbm/acre)	<u>20</u>	Stems remaining/acre	_____		
Average stems/acre cut	<u>20</u>	Basal area/acre before	_____	REMARKS	
Average d.b.h. of stems cut (inches)	<u>30</u>	Basal area/acre after	_____		
Stand age (years)	<u>300</u>	Average d.b.h. before (inches)	_____		
Cutting prescription	<u>Shelterwood</u>	Average d.b.h. after (inches)	_____		
Yarding method	<u>Tractor</u>	Thinning method	_____		
Slash treatment	<u>Machine piled & burned</u>	Slash treatment	_____		
Period since cut or treatment (months)	<u>24</u>				



4-DF-4-PC

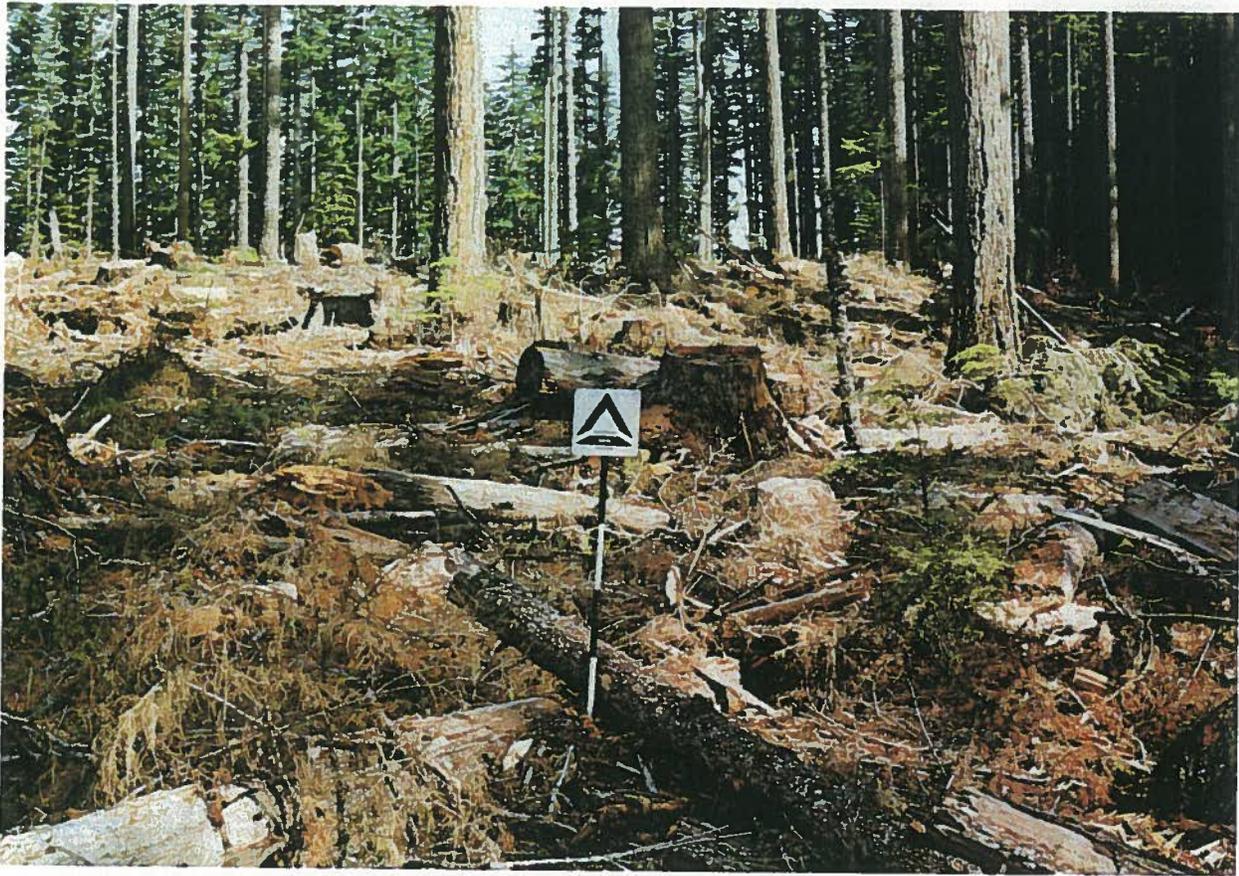
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LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.8</u>
0.25-1.0	3.5	232	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>95</u>
1.1-3.0	5.8	461	Average duff and litter depth	(inches) <u>4.8</u>
3.1-9.0	16.0	1,243	Sound residue 3.1-inch diameter and larger	western hemlock (percent) <u>63</u>
9.1-20.0	2.6	258		white fir (percent) <u>3</u>
20.1+	0	0		other (percent) <u>1</u>
Total	27.9	2,194	Rotted residue 3.1-inch diameter and larger	(percent) <u>33</u>
HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>43</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>HH</u>
Net volume cruised (M fbm/acre)	<u>33</u>	Stems remaining/acre	_____	
Average stems/acre cut	<u>94</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>18</u>	Basal area/acre after	_____	
Stand age (years)	<u>250</u>	Average d.b.h. before (inches)	_____	
Cutting prescription	<u>Shelterwood</u>	Average d.b.h. after (inches)	_____	
Yarding method	<u>Tractor</u>	Thinning method	_____	
Slash treatment	<u>None</u>	Slash treatment	_____	
Period since cut or treatment (months)	<u>9</u>			



5-DF-4-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	0.2
0.25-1.0	1.4	91	Ground area covered by residue 1/4-inch diameter and larger (percent)	40
1.1-3.0	3.1	247	Average duff and litter depth (inches)	1.1
3.1-9.0	6.8	488	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) 84
9.1-20.0	13.2	898		western hemlock (percent) 10
20.1+	10.5	698		other (percent) 1
Total	35.0	2,422	Rotted residue 3.1-inch diameter and larger (percent)	5
HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	53	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification
Net volume cruised (M fbm/acre)	19	Stems remaining/acre	_____	LM
Average stems/acre cut	20	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	30	Basal area/acre after	_____	
Stand age (years)	300	Average d.b.h. before (inches)	_____	
Cutting prescription	Shelterwood	Average d.b.h. after (inches)	_____	
Yarding method	Tractor	Thinning method	_____	
Slash treatment	Machine piled & burned	Slash treatment	_____	
Period since cut or treatment (months)	16			



6-DF-4-PC

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LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	0.7
0.25-1.0	2.6	148	Ground area covered by residue 1/4-inch diameter and larger (percent)	89
1.1-3.0	6.2	382	Average duff and litter depth (inches)	3.3
3.1-9.0	12.6	893	Sound residue 3.1-inch diameter and larger <u>Douglas-fir</u> (percent)	79
9.1-20.0	27.6	2,009	<u>western hemlock</u> (percent)	3
20.1+	4.3	282	(percent)	
Total	53.3	3,714	Rotted residue 3.1-inch diameter and larger (percent)	18

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	116	Stems cut/acre		U.S. Forest Service Region 6 fuel type identification <u>HH</u>
Net volume cruised (M fbm/acre)	89	Stems remaining/acre		
Average stems/acre cut	55	Basal area/acre before		REMARKS
Average d.b.h. of stems cut (inches)	32	Basal area/acre after		
Stand age (years)	250+	Average d.b.h. before (inches)		
Cutting prescription <u>Shelterwood</u>		Average d.b.h. after (inches)		
Yarding method <u>High-lead</u>		Thinning method		
Slash treatment <u>None</u>		Slash treatment		
Period since cut or treatment (months)	1			



7-DF-4-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.7</u>
0.25-1.0	3.6	240	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>96</u>
1.1-3.0	9.5	759	Average duff and litter depth	(inches) <u>5.2</u>
3.1-9.0	14.6	1,128	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) <u>56</u>
9.1-20.0	2.5	192		western redcedar (percent) <u>35</u>
20.1+	31.6	2,463		other (percent) <u>3</u>
Total	61.8	4,782	Rotted residue 3.1-inch diameter and larger	(percent) <u>6</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	
Gross volume cruised (M fbm/acre)	<u>44</u>		Stems cut/acre	_____
Net volume cruised (M fbm/acre)	<u>28</u>		Stems remaining/acre	_____
Average stems/acre cut	<u>15</u>		Basal area/acre before	_____
Average d.b.h. of stems cut (inches)	<u>38</u>		Basal area/acre after	_____
Stand age (years)	<u>250</u>		Average d.b.h. before (inches)	_____
Cutting prescription	<u>Overstory removal</u>		Average d.b.h. after (inches)	_____
Yarding method	<u>Tractor</u>		Thinning method	_____
Slash treatment	<u>None</u>		Slash treatment	_____
Period since cut or treatment (months)	<u>8</u>			
			FUEL RATING	
			U.S. Forest Service Region 6 fuel type identification <u>HE</u>	
			REMARKS	



8-DF-4-PC

DATA

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	3.6	237	Average residue depth	(feet) <u>1.9</u>
1.1-3.0	8.5	680	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>95</u>
3.1-9.0	9.9	875	Average duff and litter depth	(inches) <u>8.6</u>
9.1-20.0	26.5	2,588	Sound residue 3.1-inch diameter and larger	western redcedar (percent) <u>18</u>
20.1+	40.2	3,992		Douglas-fir (percent) <u>12</u>
Total	88.7	8,372		other (percent) <u>2</u>
			Rotted residue 3.1-inch diameter and larger	(percent) <u>68</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>16</u>	Stems cut/acre	_____	U.S. Forest Service Region 6	
Net volume cruised (M fbm/acre)	<u>11</u>	Stems remaining/acre	_____	fuel type identification	<u>MH</u>
Average stems/acre cut	<u>26</u>	Basal area/acre before	_____	REMARKS	
Average d.b.h. of stems cut (inches)	<u>20</u>	Basal area/acre after	_____		
Stand age (years)	<u>450</u>	Average d.b.h. before (inches)	_____		
Cutting prescription	<u>Tree selection</u>	Average d.b.h. after (inches)	_____		
Yarding method	<u>Tractor</u>	Thinning method	_____		
Slash treatment	<u>None</u>	Slash treatment	_____		
Period since cut or treatment (months)	<u>8</u>				



9-DF-4-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.6</u>
0.25-1.0	2.3	156	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>75</u>
1.1-3.0	4.9	396	Average duff and litter depth	(inches) <u>3.3</u>
3.1-9.0	11.9	879	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>56</u>
9.1-20.0	25.6	1,927		<u>western hemlock</u> (percent) <u>33</u>
20.1+	63.6	4,355		<u>other</u> (percent) <u>2</u>
Total	108.3	7,713	Rotted residue 3.1-inch diameter and larger	(percent) <u>9</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	
Gross volume cruised (M fbm/acre)	<u>15</u>		Stems cut/acre	_____
Net volume cruised (M fbm/acre)	<u>11</u>		Stems remaining/acre	_____
Average stems/acre cut	<u>32</u>		Basal area/acre before	_____
Average d.b.h. of stems cut (inches)	<u>20</u>		Basal area/acre after	_____
Stand age (years)	<u>100+</u>		Average d.b.h. before (inches)	_____
Cutting prescription <u>Tree selection</u>			Average d.b.h. after (inches)	_____
Yarding method <u>Rubber-tired skidder</u>			Thinning method	_____
Slash treatment <u>None</u>			Slash treatment	_____
Period since cut or treatment (months)	<u>12</u>			
			FUEL RATING	
			U.S. Forest Service Region 6 fuel type identification <u>MH</u>	
			REMARKS	

DOUGLAS-FIR—HEMLOCK

SIZE CLASS 3

PARTIAL CUT

A SERIES OF 6 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.



1-DF-3-PC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue/depth (feet) <u>0.4</u>	
0.25-1.0	1.3	85	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>76</u>
1.1-3.0	2.8	224	Average duff and litter depth	(inches) <u>1.3</u>
3.1-9.0	4.8	356	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) <u>71</u>
9.1-20.0	0	0		western redcedar (percent) <u>13</u>
20.1+	0	0		(percent) _____
Total	8.9	665	Rotted residue 3.1-inch diameter and larger	(percent) <u>16</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>8.2</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>LM</u>
Net volume cruised (M fbm/acre)	<u>7.9</u>	Stems remaining/acre	_____	
Average stems/acre cut	<u>41</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>12</u>	Basal area/acre after	_____	
Stand age (years)	<u>60</u>	Average d.b.h. before (inches)	_____	
Cutting prescription <u>Tree selection</u>		Average d.b.h. after (inches)	_____	
Yarding method <u>Tractor</u>		Thinning method	_____	
Slash treatment <u>None</u>		Slash treatment	_____	
Period since cut or treatment (months)	<u>1</u>			



2-DF-3-PC

DATA 2-DF-3

LOADING			OTHER MEASUREMENTS		
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	<u>0.2</u>	
0.25-1.0	2.0	112	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>68</u>	
1.1-3.0	2.1	129	Average duff and litter depth (inches)	<u>1.3</u>	
3.1-9.0	10.8	733	Sound residue 3.1-inch diameter and larger <u>Douglas-fir</u> (percent)	<u>96</u>	
9.1-20.0	0	0	(percent)	_____	
20.1+	0	0	(percent)	_____	
Total	14.9	974	Rotted residue 3.1-inch diameter and larger (percent)	<u>4</u>	
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>3.0</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification	<u>MM</u>
Net volume cruised (M fbm/acre)	<u>2.8</u>	Stems remaining/acre	_____	REMARKS	
Average stems/acre cut	<u>35</u>	Basal area/acre before	_____		
Average d.b.h. of stems cut (inches)	<u>12</u>	Basal area/acre after	_____		
Stand age (years)	<u>50</u>	Average d.b.h. before (inches)	_____		
Cutting prescription <u>Tree selection</u>		Average d.b.h. after (inches)	_____		
Yarding method <u>Rubber-tired skidder</u>		Thinning method	_____		
Slash treatment <u>None</u>		Slash treatment	_____		
Period since cut or treatment (months)	<u>8</u>				



4-DF-3-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	1.9	108	Average residue depth (feet)	0.5
1.1-3.0	8.0	495	Ground area covered by residue 1/4-inch diameter and larger (percent)	83
3.1-9.0	21.1	1,546	Average duff and litter depth (inches)	8.2
9.1-20.0	31.9	2,860	Sound residue 3.1-inch diameter and larger Douglas-fir (percent)	45
20.1+	2.6	281	(percent)	
Total	65.5	5,290	(percent)	
			Rotted residue 3.1-inch diameter and larger (percent)	55

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	66.1	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>MH</u>
Net volume cruised (M fbm/acre)	59.6	Stems remaining/acre	_____	
Average stems/acre cut	105	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	22	Basal area/acre after	_____	
Stand age (years)	90	Average d.b.h. before (inches)	_____	
Cutting prescription <u>Shelterwood</u>		Average d.b.h. after (inches)	_____	
Yarding method <u>High-lead</u>		Thinning method	_____	
Slash treatment <u>Fall broadcast burn</u>		Slash treatment	_____	
Period since cut or treatment (months)	22			



6-DF-3-PC

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6-DF.

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	1.8	122	Average residue depth	(feet) 0.3
1.1-3.0	2.6	205	Ground area covered by residue 1/4-inch diameter and larger	(percent) 71
3.1-9.0	14.4	1,106	Average duff and litter depth	(inches) 1.8
9.1-20.0	4.5	354	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) 61
20.1+	64.4	4,882		white fir (percent) 6
Total	87.7	6,669		other (percent) 2
			Rotted residue 3.1-inch diameter and larger	(percent) 31
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	
Gross volume cruised (M fbm/acre)	6.3		Stems cut/acre	_____
Net volume cruised (M fbm/acre)	5.7		Stems remaining/acre	_____
Average stems/acre cut	46		Basal area/acre before	_____
Average d.b.h. of stems cut (inches)	11		Basal area/acre after	_____
Stand age (years)	50		Average d.b.h. before (inches)	_____
Cutting prescription	Tree selection		Average d.b.h. after (inches)	_____
Yarding method	Tractor		Thinning method	_____
Slash treatment	Hand piled & burned		Slash treatment	_____
Period since cut or treatment (months)	12			
			FUEL RATING	
			U.S. Forest Service Region 6 fuel type identification <u>LM</u>	
			REMARKS	
			Material 9.1+ inches in diameter was a result of logging old-growth stand in early 1900's.	

DOUGLAS-FIR--HEMLOCK
SIZE CLASS 1
PRECOMMERCIAL THINNING

A SERIES OF 4 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.



1-DF-1-TH

LOADING				OTHER MEASUREMENTS		
Size class (inches)	Weight (tons/acre)		Volume (ft ³ /acre)		Average residue depth (feet)	<u>0.2</u>
0.25-1.0	0.4	0	27	0	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>33</u>
1.1-3.0	0.4	0	28	0	Average duff and litter depth (inches)	<u>1.3</u>
3.1-9.0	0	<u>1/1.4</u>	0	<u>1/117</u>	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir (percent) 56</u>
9.1-20.0	0	<u>1/6.0</u>	0	<u>1/606</u>		<u>western redcedar (percent) 14</u>
20.1+	0	<u>1/10.8</u>	0	<u>1/724</u>		(percent) _____
Total	0.8	<u>1/18.2</u>	55	<u>1/1,447</u>	Rotted residue 3.1-inch diameter and larger (percent)	<u>30</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	_____		Stems cut/acre	<u>1,547</u>	U.S. Forest Service Region 6 fuel type identification <u>LL</u>	
Net volume cruised (M fbm/acre)	_____		Stems remaining/acre	<u>700</u>	REMARKS	
Average stems/acre cut	_____		Basal area/acre before	<u>196</u>		
Average d.b.h. of stems cut (inches)	_____		Basal area/acre after	<u>61</u>	Residue loadings footnoted were present prior to thinning.	
Stand age (years)	_____		Average d.b.h. before (inches)	<u>4</u>		
Cutting prescription	_____		Average d.b.h. after (inches)	<u>4</u>		
Yarding method	_____		Thinning method	<u>Chainsaw</u>		
Slash treatment	_____		Slash treatment	<u>Chipped</u>		
Period since cut or treatment (months)	_____					

^{1/} See remarks.

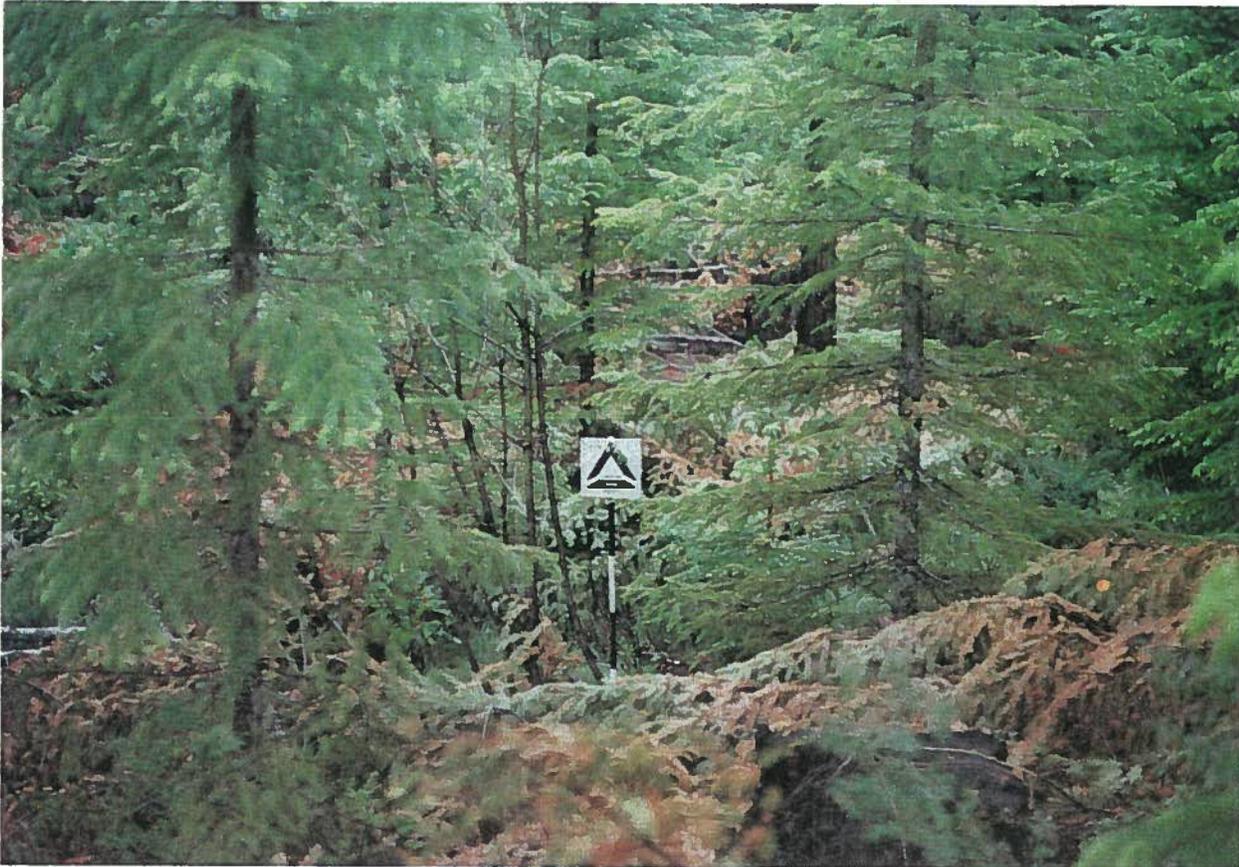


2-DF-1-TH

LOADING				OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		Average residue depth	(feet) <u>0.4</u>
0.25-1.0	0.7	41	0	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>61</u>
1.1-3.0	0.9	57	0	Average duff and litter depth	(inches) <u>1.0</u>
3.1-9.0	0 ^{1/} 2.2	0	^{1/} 239	Sound residue 3.1-inch diameter and larger	(percent) _____
9.1-20.0	0 ^{1/} 16.3	0	^{1/} 1,744	_____	(percent) _____
20.1+	0 ^{1/} 75.0	0	^{1/} 8,015	Rotted residue 3.1-inch diameter and larger	(percent) <u>100</u>
Total	1.6 ^{1/} 93.5	98	^{1/} 9,998		

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	_____	Stems cut/acre	<u>1,057</u>	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre)	_____	Stems remaining/acre	<u>241</u>	fuel type identification <u>LH</u>
Average stems/acre cut	_____	Basal area/acre before	<u>113</u>	REMARKS
Average d.b.h. of stems cut (inches)	_____	Basal area/acre after	<u>47</u>	Residue loadings footnoted were present prior to thinning.
Stand age (years)	_____	Average d.b.h. before (inches)	<u>4</u>	
Cutting prescription	_____	Average d.b.h. after (inches)	<u>6</u>	
Yarding method	_____	Thinning method	<u>Chainsaw</u>	
Slash treatment	_____	Slash treatment	<u>Hand piled & burned</u>	
Period since cut or treatment (months)	_____			

^{1/} See remarks.



3-DF-1-TH

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	Ground area covered by residue 1/4-inch diameter and larger (percent)	Average duff and litter depth (inches)	Sound residue 3.1-inch diameter and larger	Rotted residue 3.1-inch diameter and larger
0.25-1.0	2.1	0	122	0	1.0	69	0
1.1-3.0	2.9	0	181	0	0.9	40	0
3.1-9.0	2.7	$\frac{1}{2}$ 2.9	171	$\frac{1}{2}$ 267	2	2	0
9.1-20.0	0	$\frac{1}{10}$ 10.1	0	$\frac{1}{866}$	58		0
20.1+	0	0	0	0			0
Total	7.7	$\frac{1}{13}$ 13.0	474	$\frac{1}{1,133}$			

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	_____	Stems cut/acre	<u>159</u>	U.S. Forest Service Region 6 fuel type identification <u>HH</u>
Net volume cruised (M fbm/acre)	_____	Stems remaining/acre	<u>219</u>	
Average stems/acre cut	_____	Basal area/acre before	<u>52</u>	REMARKS Residue loadings footnoted were present prior to thinning
Average d.b.h. of stems cut (inches)	_____	Basal area/acre after	<u>43</u>	
Stand age (years)	_____	Average d.b.h. before (inches)	<u>5</u>	
Cutting prescription	_____	Average d.b.h. after (inches)	<u>6</u>	
Yarding method	_____	Thinning method	<u>Chainsaw</u>	
Slash treatment	_____	Slash treatment	<u>None</u>	
Period since cut or treatment (months)	_____			

$\frac{1}{}$ See remarks.



4-DF-1-TH

Size class (inches)	Weight (tons/acre)		Volume (ft ³ /acre)		Average residue depth (feet)	Average residue depth (feet)
0.25-1.0	4.1	0	272	0	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>2.3</u> <u>93</u>
1.1-3.0	5.3	0	422	0	Average duff and litter depth (inches)	<u>1.3</u>
3.1-9.0	1.6	<u>1/14.9</u>	108	<u>1/1,072</u>	Sound residue 3.1-inch diameter and larger <u>Douglas-fir</u> (percent)	<u>90</u>
9.1-20.0	0	<u>1/15.5</u>	0	<u>1/1,054</u>	<u>western redcedar</u> (percent)	<u>7</u>
20.1+	0	<u>1/81.5</u>	0	<u>1/5,620</u>	(percent)	
Total	11.0	<u>1/111.9</u>	802	<u>1/7,746</u>	Rotted residue 3.1-inch diameter and larger (percent)	<u>3</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	_____	Stems cut/acre	<u>1,058</u>	U.S. Forest Service Region 6 fuel type identification <u>HE</u>
Net volume cruised (M fbm/acre)	_____	Stems remaining/acre	<u>317</u>	
Average stems/acre cut	_____	Basal area/acre before	<u>120</u>	REMARKS Residue loadings footnoted were present prior to thinning.
Average d.b.h. of stems cut (inches)	_____	Basal area/acre after	<u>43</u>	
Stand age (years)	_____	Average d.b.h. before (inches)	<u>4</u>	
Cutting prescription	_____	Average d.b.h. after (inches)	<u>5</u>	
Yarding method	_____	Thinning method	<u>Chainsaw</u>	
Slash treatment	_____	Slash treatment	<u>None</u>	
Period since cut or treatment (months)	_____			

^{1/} See remarks.

DOUGLAS-FIR—HARDWOOD

SIZE CLASS 4

CLEARCUT

A SERIES OF 7 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.



1-DFHD-4-CC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	Ground area covered by residue 1/4-inch diameter and larger (percent)	Average duff and litter depth (inches)	Sound residue 3.1-inch diameter and larger Douglas-fir (percent)	tanoak (percent)	Rotted residue 3.1-inch diameter and larger (percent)
0.25-1.0	1.1	70	0.2	55	0	32	18	50
1.1-3.0	3.1	252						
3.1-9.0	3.7	255						
9.1-20.0	2.5	235						
20.1+	0	0						
Total	10.4	812						

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	46.4	Stems cut/acre		U.S. Forest Service Region 6 fuel type identification <u>LM</u>
Net volume cruised (M fbm/acre)	33.3	Stems remaining/acre		
Average stems/acre cut	30	Basal area/acre before		REMARKS Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where: 1 = <5 ft in height 2 = 5-15 ft in height 3 = >15 ft in height and A = 0-33% understory crown space occupied B = 34-66% " " " " C = 67-100% " " " " was rated by District Foresters as <u>3C</u> .
Average d.b.h. of stems cut (inches)	35	Basal area/acre after		
Stand age (years)	250	Average d.b.h. before (inches)		
Cutting prescription	Clearcut	Average d.b.h. after (inches)		
Yarding method	High-lead	Thinning method		
Slash treatment	Spring broadcast burn	Slash treatment		
Period since cut or treatment (months)	<12			



2-DFHD-4-CC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	2.0	132	Average residue depth	(feet) <u>0.2</u>
1.1-3.0	5.1	405	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>61</u>
3.1-9.0	8.8	577	Average duff and litter depth	(inches) <u>0</u>
9.1-20.0	2.6	176	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>95</u>
20.1+	0	0		<u>tanoak</u> (percent) <u>5</u>
Total	18.5	1,290	Rotted residue 3.1-inch diameter and larger	(percent) <u>0</u>
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre)	<u>40.0</u>		Stems cut/acre	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre)	<u>35.0</u>		Stems remaining/acre	fuel type identification <u>MM</u>
Average stems/acre cut	<u>29</u>		Basal area/acre before	REMARKS
Average d.b.h. of stems cut (inches)	<u>33</u>		Basal area/acre after	Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where:
Stand age (years)	<u>200</u>		Average d.b.h. before (inches)	1 = <5 ft in height
Cutting prescription	<u>Clearcut</u>		Average d.b.h. after (inches)	2 = 5-15 ft in height
Yarding method	<u>High-lead</u>		Thinning method	3 = >15 ft in height
Slash treatment	<u>Spring broadcast burn</u>		Slash treatment	and
Period since cut or treatment (months)	<u>7</u>			A = 0-33% understory crown space occupied
				B = 34-66% " " " "
				C = 67-100% " " " "
				was rated by District Foresters as <u>2C</u> .



3-DFHD-4-CC

LOADING				
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	<u>0.2</u>
0.25-1.0	1.3	85	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>45</u>
1.1-3.0	4.0	321	Average duff and litter depth (inches)	<u>0</u>
3.1-9.0	16.6	1,037	Sound residue 3.1-inch diameter and larger	Douglas-fir (percent) <u>50</u>
9.1-20.0	9.6	795		tanoak (percent) <u>19</u>
20.1+	6.8	530		other (percent) <u>1</u>
Total	38.3	2,768	Rotted residue 3.1-inch diameter and larger (percent)	<u>30</u>
HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>43.3</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification
Net volume cruised (M fbm/acre)	<u>36.7</u>	Stems remaining/acre	_____	<u>MM</u>
Average stems/acre cut	<u>29</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>12</u>	Basal area/acre after	_____	Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where:
Stand age (years)	<u>200</u>	Average d.b.h. before (inches)	_____	1 = <5 ft in height
Cutting prescription	<u>Clearcut</u>	Average d.b.h. after (inches)	_____	2 = 5-15 ft in height
Yarding method	<u>Slackline</u>	Thinning method	_____	3 = >15 ft in height
Slash treatment	<u>Spring broadcast burn</u>	Slash treatment	_____	and
Period since cut or treatment (months)	<u><12</u>			A = 0-33% understory crown space occupied
				B = 34-66% " " " "
				C = 67-100% " " " "
				was rated by District Foresters as <u>3C</u> .



4-DFHD-4-CC

LOADING			OTHER MEASUREMENTS			
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth	(feet) <u>0.5</u>		
0.25-1.0	3.7	244	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>81</u>		
1.1-3.0	6.3	502	Average duff and litter depth	(inches) <u>0</u>		
3.1-9.0	15.3	968	Sound residue 3.1-inch diameter and larger	<u>Douglas-fir</u> (percent) <u>82</u>		
9.1-20.0	12.8	828		<u>tanoak</u> (percent) <u>16</u>		
20.1+	3.6	239		<u>other</u> (percent) <u>1</u>		
Total	41.7	2,781	Rotted residue 3.1-inch diameter and larger	(percent) <u>1</u>		
HARVEST INFORMATION			PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>48.8</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification		<u>MM</u>
Net volume cruised (M fbm/acre)	<u>42.3</u>	Stems remaining/acre	_____	REMARKS		Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where: 1 = <5 ft in height 2 = 5-15 ft in height 3 = >15 ft in height and A = 0-33% understory crown space occupied B = 34-66% " " " " C = 67-100% " " " " was rated by District Foresters as <u>3B</u> .
Average stems/acre cut	<u>37</u>	Basal area/acre before	_____			
Average d.b.h. of stems cut (inches)	<u>31</u>	Basal area/acre after	_____			
Stand age (years)	<u>200</u>	Average d.b.h. before (inches)	_____			
Cutting prescription	<u>Clearcut</u>	Average d.b.h. after (inches)	_____			
Yarding method	<u>High-lead</u>	Thinning method	_____			
Slash treatment	<u>YUM*</u>	Slash treatment	_____			
Period since cut or treatment (months)	<u><12</u>					

*Required yarding unmerchantable material (YUM) down to 8 inches, small end and 10 feet in length.



6-DFHD-4-CC

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OTHER SUREMEI

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	2.1
0.25-1.0	5.6	371	Ground area covered by residue 1/4-inch diameter and larger	(percent) 97
1.1-3.0	10.4	833	Average duff and litter depth	(inches) 0
3.1-9.0	51.6	2,847	Sound residue 3.1-inch diameter and larger	tanoak (percent) 75
9.1-20.0	13.8	793		Douglas-fir (percent) 12
20.1+	0	0		other (percent) 11
Total	81.4	4,844	Rotted residue 3.1-inch diameter and larger	(percent) 2

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>43.5</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>EE</u>
Net volume cruised (M fbm/acre)	<u>38.2</u>	Stems remaining/acre	_____	REMARKS Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where: 1 = <5 ft in height 2 = 5-15 ft in height 3 = >15 ft in height and A = 0-33% understory crown space occupied B = 34-66% " " " " C = 67-100% " " " " was rated by District Foresters as <u>3C</u> .
Average stems/acre cut	<u>34</u>	Basal area/acre before	_____	
Average d.b.h. of stems cut (inches)	<u>34</u>	Basal area/acre after	_____	
Stand age (years)	<u>200</u>	Average d.b.h. before (inches)	_____	
Cutting prescription	<u>Clearcut</u>	Average d.b.h. after (inches)	_____	
Yarding method	<u>Slackline</u>	Thinning method	_____	
Slash treatment	<u>None</u>	Slash treatment	_____	
Period since cut or treatment (months)	<u>12</u>			



7-DFHD-4-CC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)		
0.25-1.0	6.5	435	Average residue depth	(feet) <u>1.9</u>
1.1-3.0	10.5	842	Ground area covered by residue 1/4-inch diameter and larger	(percent) <u>95</u>
3.1-9.0	77.5	4,083	Average duff and litter depth	(inches) <u>0</u>
9.1-20.0	16.3	842	Sound residue 3.1-inch diameter and larger	madrone (percent) <u>45</u>
20.1+	0	0		tanoak (percent) <u>39</u>
Total	110.8	6,202		other (percent) <u>14</u>
			Rotted residue 3.1-inch diameter and larger	(percent) <u>2</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	<u>54.7</u>	Stems cut/acre	_____	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre)	<u>46.6</u>	Stems remaining/acre	_____	fuel type identification <u>EE</u>
Average stems/acre cut	<u>34</u>	Basal area/acre before	_____	REMARKS
Average d.b.h. of stems cut (inches)	<u>31</u>	Basal area/acre after	_____	Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where:
Stand age (years)	<u>200</u>	Average d.b.h. before (inches)	_____	1 = <5 ft in height
Cutting prescription	<u>Clearcut</u>	Average d.b.h. after (inches)	_____	2 = 5-15 ft in height
Yarding method	<u>Slackline</u>	Thinning method	_____	3 = >15 ft in height
Slash treatment	<u>None</u>	Slash treatment	_____	and
Period since cut or treatment (months)	<u><12</u>			A = 0-33% understory crown space occupied
				B = 34-66% " " " "
				C = 67-100% " " " "
				was rated by District Foresters as <u>3C</u> .

DOUGLAS-FIR—HARDWOOD

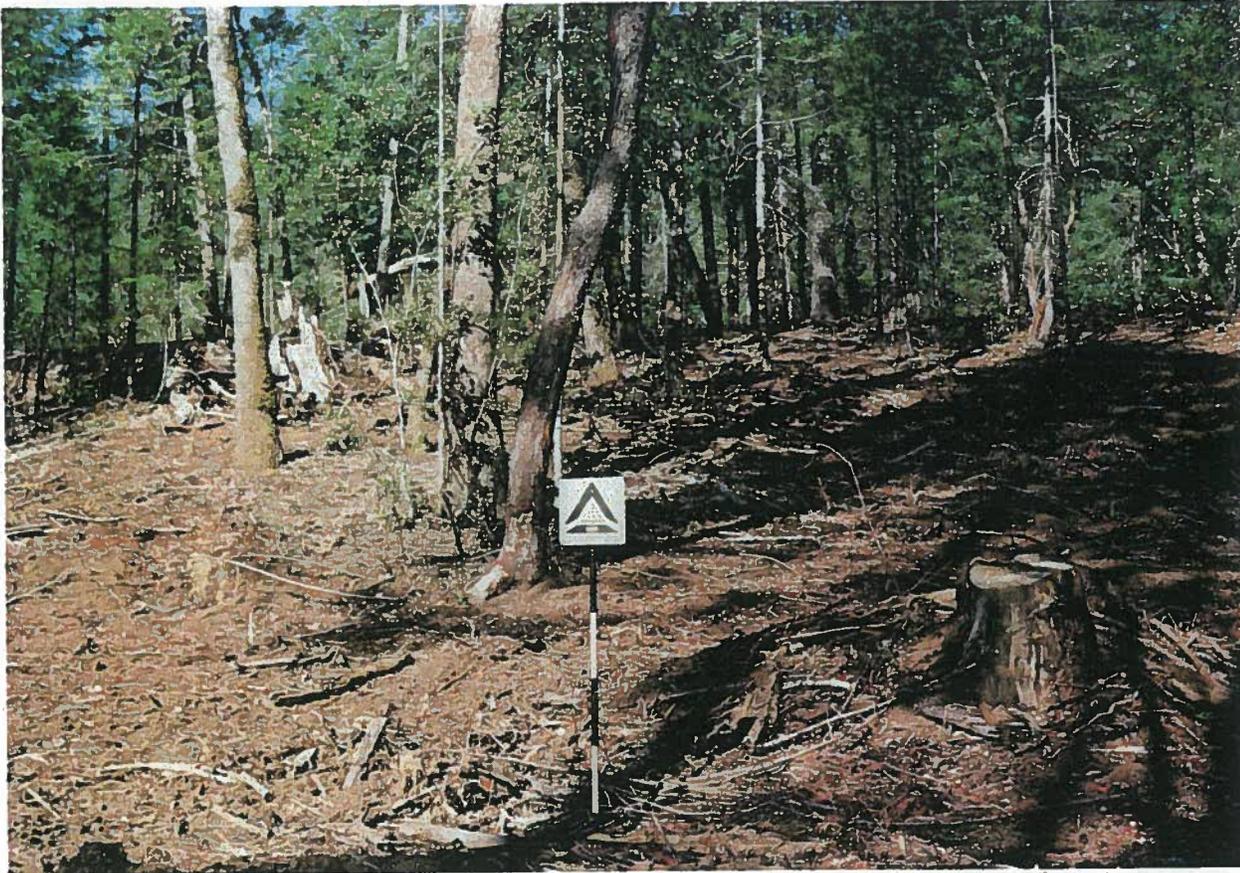
SIZE CLASS 4

PARTIAL CUT

A SERIES OF 6 LEVELS

Reminders to users:

1. The marker in these photos is 1 foot square, and the pole is painted in contrasting colors at 1-foot intervals to provide perspective.
2. Stumps are not included in residue quantities.
3. Rotted residue is that which would come apart or splinter when kicked.

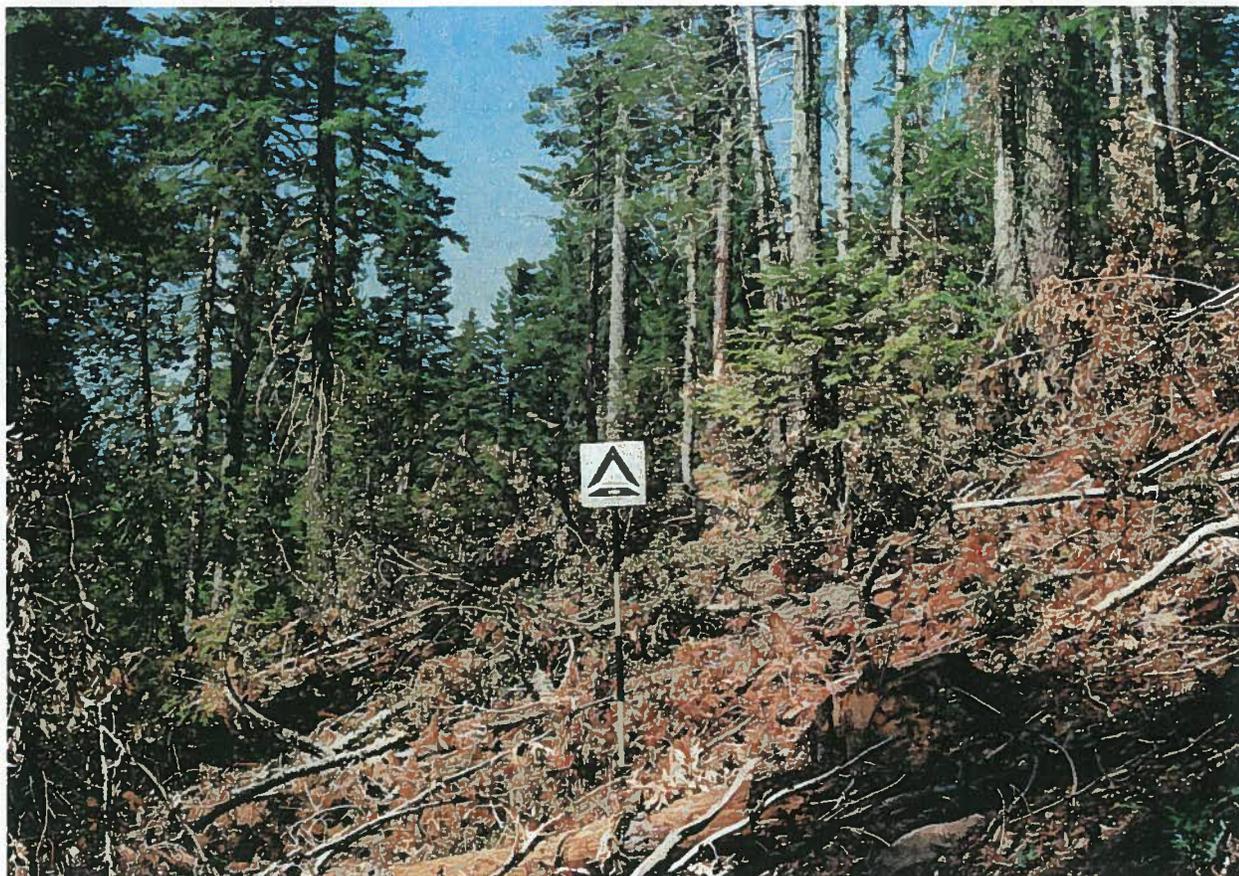


1-DFHD-4-PC

DATA IT due de ctive 1-DFH PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	<u>0.1</u>
0.25-1.0	0.7	49	Ground area covered by residue 1/4-inch diameter and larger (percent)	<u>40</u>
1.1-3.0	3.4	270	Average duff and litter depth (inches)	<u>0.1</u>
3.1-9.0	4.0	227	Sound residue 3.1-inch diameter and larger <u>madrone</u> (percent)	<u>16</u>
9.1-20.0	4.2	415	<u>Douglas-fir</u> (percent)	<u>11</u>
20.1+	0	0	<u>other</u> (percent)	<u>10</u>
Total	12.3	961	Rotted residue 3.1-inch diameter and larger (percent)	<u>63</u>

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING	
Gross volume cruised (M fbm/acre)	<u>20.3</u>	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>LL</u>	
Net volume cruised (M fbm/acre)	<u>16.4</u>	Stems remaining/acre	_____	REMARKS	
Average stems/acre cut	<u>9</u>	Basal area/acre before	_____		
Average d.b.h. of stems cut (inches)	<u>38</u>	Basal area/acre after	_____	Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where: 1 = <5 ft in height 2 = 5-15 ft in height 3 = >15 ft in height and A = 0-33% understory crown space occupied B = 34-66% " " " " C = 67-100% " " " " was rated by District Foresters as <u>3A</u> .	
Stand age (years)	<u>250+</u>	Average d.b.h. before (inches)	_____		
Cutting prescription	<u>Overstory removal</u>	Average d.b.h. after (inches)	_____		
Yarding method	<u>Rubber-tired skidder</u>	Thinning method	_____		
Slash treatment	<u>Machine piled</u>	Slash treatment	_____		
Period since cut or treatment (months)	<u><12</u>				



2-DFHD-4-PC

LOADING			OTHER MEASUREMENTS	
Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)	0.4
0.25-1.0	2.0	132	Ground area covered by residue 1/4-inch diameter and larger (percent)	69
1.1-3.0	8.7	693	Average duff and litter depth (inches)	0.4
3.1-9.0	5.1	409	Sound residue 3.1-inch diameter and larger western white pine (percent)	57
9.1-20.0	2.8	235	red fir (percent)	22
20.1+	0	0	other (percent)	19
Total	18.6	1,469	Rotted residue 3.1-inch diameter and larger (percent)	2

HARVEST INFORMATION		PRECOMMERCIAL THINNING INFORMATION		FUEL RATING
Gross volume cruised (M fbm/acre)	48.3	Stems cut/acre	_____	U.S. Forest Service Region 6 fuel type identification <u>HH</u>
Net volume cruised (M fbm/acre)	37.5	Stems remaining/acre	_____	
Average stems/acre cut	20	Basal area/acre before	_____	REMARKS Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where: 1 = <5 ft in height 2 = 5-15 ft in height 3 = >15 ft in height and A = 0-33% understory crown space occupied B = 34-66% " " " " C = 67-100% " " " " was rated by District Foresters as <u>2A</u> .
Average d.b.h. of stems cut (inches)	34	Basal area/acre after	_____	
Stand age (years)	250	Average d.b.h. before (inches)	_____	
Cutting prescription <u>Shelterwood</u>		Average d.b.h. after (inches)	_____	
Yarding method <u>Skyline</u>		Thinning method	_____	
Slash treatment <u>YUM*</u>		Slash treatment	_____	
Period since cut or treatment (months)	<12			

*Required yarding unmerchantable material (YUM) down to 8 inches in diameter, small end and 10 feet in length.



4-DFHD-4-PC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)
0.25-1.0	5.2	345	1.3
1.1-3.0	10.7	859	Ground area covered by residue 1/4-inch diameter and larger (percent) 95
3.1-9.0	12.9	785	Average duff and litter depth (inches) 1.1
9.1-20.0	5.7	340	Sound residue 3.1-inch diameter and larger Douglas-fir (percent) 78
20.1+	8.0	532	madrone (percent) 16
Total	42.5	2,861	other (percent) 4
			Rotted residue 3.1-inch diameter and larger (percent) 2

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>37.4</u>	Stems cut/acre _____	U.S. Forest Service Region 6 fuel type identification <u>HH</u>
Net volume cruised (M fbm/acre) <u>29.0</u>	Stems remaining/acre _____	REMARKS
Average stems/acre cut <u>26</u>	Basal area/acre before _____	
Average d.b.h. of stems cut (inches) <u>37</u>	Basal area/acre after _____	Down and dead hardwoods comprise much of the residue in this photo series level.
Stand age (years) <u>200+</u>	Average d.b.h. before (inches) _____	The understory hardwood stand prior to logging, using rating criteria where:
Cutting prescription <u>Overstory removal</u>	Average d.b.h. after (inches) _____	1 = <5 ft in height
Yarding method <u>Tractor</u>	Thinning method _____	2 = 5-15 ft in height
Slash treatment <u>None</u>	Slash treatment _____	3 = >15 ft in height
Period since cut or treatment (months) <u><12</u>		and
		A = 0-33% understory crown space occupied
		B = 34-66% " " " "
		C = 67-100% " " " "
		was rated by District Foresters as <u>3B</u> .



5-DFHD-4-PC

Size class (inches)	Weight (tons/acre)	Volume (ft ³ /acre)	Average residue depth (feet)
0.25-1.0	3.0	198	0.5
1.1-3.0	8.8	703	Ground area covered by residue 1/4-inch diameter and larger (percent) 85
3.1-9.0	29.8	1,781	Average duff and litter depth (inches) 1.2
9.1-20.0	5.8	397	Sound residue 3.1-inch diameter and larger <u>madrone</u> (percent) 25
20.1+	33.2	2,720	<u>Douglas-fir</u> (percent) 19
Total	80.6	5,799	<u>other</u> (percent) 22
			Rotted residue 3.1-inch diameter and larger (percent) 34

HARVEST INFORMATION	PRECOMMERCIAL THINNING INFORMATION	FUEL RATING
Gross volume cruised (M fbm/acre) <u>35.2</u>	Stems cut/acre _____	U.S. Forest Service Region 6
Net volume cruised (M fbm/acre) <u>26.6</u>	Stems remaining/acre _____	fuel type identification <u>HH</u>
Average stems/acre cut <u>62</u>	Basal area/acre before _____	REMARKS
Average d.b.h. of stems cut (inches) <u>26</u>	Basal area/acre after _____	Down and dead hardwoods comprise much of the residue in this photo series level. The understory hardwood stand prior to logging, using rating criteria where:
Stand age (years) <u>150</u>	Average d.b.h. before (inches) _____	1 = <5 ft in height
Cutting prescription <u>Tree selection</u>	Average d.b.h. after (inches) _____	2 = 5-15 ft in height
Yarding method <u>Mobile yarder</u>	Thinning method _____	3 = >15 ft in height
Slash treatment <u>None</u>	Slash treatment _____	and
Period since cut or treatment (months) <u><12</u>		A = 0-33% understory crown space occupied
		B = 34-66% " " " "
		C = 67-100% " " " "
		was rated by District Foresters as <u>2C</u> .

The mission of the PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION is to provide the knowledge, technology, and alternatives for present and future protection, management, and use of forest, range, and related environments.

Within this overall mission, the Station conducts and stimulates research to facilitate and to accelerate progress toward the following goals:

1. Providing safe and efficient technology for inventory, protection, and use of resources.
2. Developing and evaluating alternative methods and levels of resource management.
3. Achieving optimum sustained resource productivity consistent with maintaining a high quality forest environment.

The area of research encompasses Oregon, Washington, Alaska, and, in some cases, California, Hawaii, the Western States, and the Nation. Results of the research are made available promptly. Project headquarters are at:

Fairbanks, Alaska	Portland, Oregon
Juneau, Alaska	Olympia, Washington
Bend, Oregon	Seattle, Washington
Corvallis, Oregon	Wenatchee, Washington
La Grande, Oregon	

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The FOREST SERVICE of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.

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