USDA FOREST SERVICE GENERAL TECHNICAL REPORT PNW-5
197

PHOTO SERIES FOR QUANTIFYING FOREST RESIDUES IN THE:

PONDEROSA PINE TYPE
PONDEROSA PINE AND ASSOCIATED SPECIES TYPE
LODGEPOLE PINE TYPE

WAYNE G. MAXWELL
FRANKLIN R. WARD

A COOPERATIVE
PUBLICATION
PUBLISHED BY:

PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATI
U.S. DEPARTMENT OF AGRICULTURE FOREST SERVI
PORTLAND, OREG

ABSTRACT

Six series of photographs display different forest residue loading levels, by size classes, for areas of like timber type and cutting practice.

Information with each photo includes measured weights, volumes and other residue data, information about the timber stand and harvest or thinning actions, and fuel ratings.

These photo series provide a fast and easy-to-use means for quantifying and describing existing and expected residues.

KEYWORDS: Residue (forest), residue management, fuel (waste wood), slash (ponderosa pine) (lodgepole pine), management (forest), forest residues estimation.

COOPERATIVE ACKNOWLEDGMENT

This publication was developed by the Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, in cooperation with the Bureau of Land Management, U.S. Department of the Interior; Washington State Department of Natural Resources; State of Oregon Forestry Department; and U.S. Forest Service, Region 6, to serve the needs of forest land managers in the Pacific Northwest.

LIST OF PLANT SPECIES CITED

Douglas-fir	*Pseudotsuga menziesii* (Mirb.) Franco
lodgepole pine	*Pinus contorta* Dougl.
ponderosa pine	*Pinus ponderosa* Laws.
subalpine fir	*Abies lasiocarpa* (Hook.) Nutt.
western larch	*Larix occidentalis* Nutt.
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)

CONTENTS

	Page
WHAT ARE THESE PHOTO SERIES?	1
WHY ARE THEY NEEDED?	1
HOW CAN THEY BE USED?	2
Inventory of Down Residue	2
Determination of Desired Residue Level	4
Prediction of Residues From Planned Cutting and Residue Changes From Treatments	4
HOW WERE THEY DEVELOPED?	5
HOW CAN THEY BE SUPPLEMENTED?	7
HOW ARE LEVELS IN THESE SERIES CODED?	7
Ponderosa Pine, Size Class 4, Clearcut	9
Ponderosa Pine, Size Class 4, Partial Cut	15
Ponderosa Pine, Size Class 1, Precommercial Thinning	27
Ponderosa Pine and Associated Species, Size Class 4, Partial Cut	41
Lodgepole Pine, Size Class 3, Clearcut	59
Lodgepole Pine, Size Class 3, Partial Cut	63

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 annually generate forest residues on millions of acres in the Western United States where these photo series may have application. Projected increase in demand for wood products and the trend away from clearcutting practices will increase this acreage if the cut remains constant or increases.

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 inland 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 inland 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 reference 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 by the Pacific Northwest Forest and Range Experiment Station, containing photo series for use in coastal Douglas-fir--hemlock and coastal Douglas-fir--hardwood types, has been published.[4]

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

[4] Maxwell, Wayne G., and Franklin R. Ward. 1976. Photo series for quantifying forest residues in the: coastal Douglas-fir--hemlock type, coastal Douglas-fir--hardwood type. USDA For. Serv. Gen. Tech. Rep. PNW-51, 103 p., illus. Pac. Northwest For. and Range Exp. Stn., Portland, Oreg.

code shows:

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

b. Forest type, e.g., PP = ponderosa pine, PP&ASSOC = ponderosa pine and associated species, LP = lodgepole pine.

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-PP-4-CC is the first photo in the series for ponderosa pine, >20-inch diameter trees, after harvest by clearcutting.

PONDEROSA PINE

SIZE CLASS 4

CLEARCUT

A SERIES OF 2 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-PP-4-CC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.9	235
1.1-3.0	6.7	439
3.1-9.0	5.3	430
9.1-20.0	3.1	332
20.1+	3.3	260
Total	22.3	1,696

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger	(percent)	75
Average duff and litter depth	(inches)	0.8
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	66
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	34

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	18.1
Net volume cruised(M fbm/acre)	15.9
Average stems/acre cut	18
Average d.b.h. of stems cut (inches)	34
Stand age (years)	250+
Cutting prescription	Clearcut
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HM

REMARKS

2-PP-4-CC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	8.1	492
1.1-3.0	8.1	530
3.1-9.0	6.3	517
9.1-20.0	17.2	1,375
20.1+	6.6	529
Total	46.3	3,443

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.7
Ground area covered by residue 1/4-inch diameter and larger	(percent)	77
Average duff and litter depth	(inches)	0.7
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	96
lodgepole pine	(percent)	1
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	3

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	13.0
Net volume cruised(M fbm/acre)	11.5
Average stems/acre cut	60
Average d.b.h. of stems cut (inches)	22
Stand age (years)	200+
Cutting prescription	Clearcut
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	EH

REMARKS

PONDEROSA PINE

SIZE CLASS 4

PARTIAL CUT

A SERIES OF 5 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-PP-4-PC

DATA SHEET Residue descriptive code [illegible]

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	0.4	25
1.1-3.0	1.8	119
3.1-9.0	0.5	40
9.1-20.0	0	0
20.1+	0	0
Total	2.7	184

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.04
Ground area covered by residue 1/4-inch diameter and larger	(percent)	16
Average duff and litter depth	(inches)	0.7
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	16.0
Net volume cruised(M fbm/acre)	15.0
Average stems/acre cut	15
Average d.b.h. of stems cut (inches)	29
Stand age (years)	300+
Cutting prescription	Shelterwood
Yarding method	Tractor
Slash treatment	Machine piled & burned
Period since cut or treatment (months)	24

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	LL

REMARKS

2-PP-4-PC

DATA SHEET

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.2	132
1.1-3.0	3.4	220
3.1-9.0	2.9	234
9.1-20.0	0	0
20.1+	0	0
Total	8.5	586

OTHER MEASUREMENTS		
Average residue depth		(feet) 0.2
Ground area covered by residue 1/4-inch diameter and larger		(percent) 43
Average duff and litter depth		(inches) 0.8
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent) 100
		(percent)
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 0

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	3.6
Net volume cruised (M fbm/acre)	3.4
Average stems/acre cut	17
Average d.b.h. of stems cut (inches)	16
Stand age (years)	110
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	ML

REMARKS

3-PP-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.7	164
1.1-3.0	5.0	324
3.1-9.0	5.7	456
9.1-20.0	0	0
20.1+	0	0
Total	13.4	944

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger	(percent)	67
Average duff and litter depth	(inches)	0.6
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	4.7
Net volume cruised(M fbm/acre)	4.6
Average stems/acre cut	30
Average d.b.h. of stems cut (inches)	20
Stand age (years)	200+
Cutting prescription	Shelterwood
Yarding method	Rubber-tired skidder
Slash treatment	None
Period since cut or treatment (months)	24

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

4-PP-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.3	139
1.1-3.0	4.8	315
3.1-9.0	4.3	341
9.1-20.0	8.2	655
20.1+	2.5	200
Total	22.1	1,650

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger	(percent)	61
Average duff and litter depth	(inches)	1.0
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	5.5
Net volume cruised(M fbm/acre)	5.4
Average stems/acre cut	15
Average d.b.h. of stems cut (inches)	20
Stand age (years)	200+
Cutting prescription	Shelterwood
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH

REMARKS

5-PP-4-PC

DATA SHEET Residue descriptive code 5-PP-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.8	231
1.1-3.0	7.4	482
3.1-9.0	7.1	575
9.1-20.0	4.6	410
20.1+	6.6	531
Total	29.5	2,229

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger	(percent)	77
Average duff and litter depth	(inches)	1.2
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	89
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	11

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	
Net volume cruised(M fbm/acre)	1/ 9.5
Average stems/acre cut	20
Average d.b.h. of stems cut (inches)	18
Stand age (years)	70
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	24

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MM

REMARKS

Area not cruised. Timber sold on a net scale basis.

1/ See remarks.

PONDEROSA PINE

SIZE CLASS 1

PRECOMMERCIAL THINNING

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-PP-1-TH

DATA SHEET Residue descriptive code 1-PP-1-TH

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.4	205
1.1-3.0	2.3	152
3.1-9.0	1.9	149
9.1-20.0	0	0
20.1+	0	0
Total	7.6	506

OTHER MEASUREMENTS		
Average residue depth		(feet) 0.5
Ground area covered by residue 1/4-inch diameter and larger		(percent) 68
Average duff and litter depth		(inches) 1.1
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent) 100
		(percent)
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent)

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	
Net volume cruised(M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	3,700
Stems remaining/acre	151
Basal area/acre before	336
Basal area/acre after	30
Average d.b.h. before (inches)	4
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	None

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	EM

REMARKS

2-PP-1-TH

DATA SHEET Residue descriptive code 2-PP-1-TH

LOADING				
Size class (inches)	Weight (tons/acre)		Volume (ft^3/acre)	
0.25-1.0	2.7	0	164	0
1.1-3.0	5.5	0	358	0
3.1-9.0	2.3	1/ 0.7	184	1/ 71
9.1-20.0	0	1/ 9.8	0	1/ 1,044
20.1+	0	0	0	0
Total	10.5	1/ 10.5	706	1/ 1,115

OTHER MEASUREMENTS		
Average residue depth		(feet) 0.7
Ground area covered by residue 1/4-inch diameter and larger		(percent) 79
Average duff and litter depth		(inches) 1.1
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent) 39
		(percent)
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 61

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	
Net volume cruised(M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	2,825
Stems remaining/acre	175
Basal area/acre before	262
Basal area/acre after	34
Average d.b.h. before (inches)	4
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	None

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH

REMARKS

Residue loadings footnoted were present prior to thinning.

One-half of tonnage in old-growth cull.

1/ See remarks.

3-PP-1-TH

DATA SHEET Residue descriptive code [illegible]

LOADING				
Size class (inches)	Weight (tons/acre)		Volume (ft^3/acre)	
0.25-1.0	3.5	0	214	0
1.1-3.0	3.2	0	210	0
3.1-9.0	5.4	1/ 0.6	431	1/ 51
9.1-20.0	0	0	0	0
20.1+	0	0	0	0
Total	12.1	1/ 0.6	855	1/ 51

OTHER MEASUREMENTS		
Average residue depth	(feet)	1.2
Ground area covered by residue 1/4-inch diameter and larger	(percent)	87
Average duff and litter depth	(inches)	1.3
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	98
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	2

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	
Net volume cruised (M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	4,825
Stems remaining/acre	175
Basal area/acre before	436
Basal area/acre after	34
Average d.b.h. before (inches)	4
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	None

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH

REMARKS

Residue loadings footnoted were present prior to thinning.

1/ See remarks.

4-PP-1-TH

LOADING				
Size class (inches)	Weight (tons/acre)		Volume (ft^3/acre)	
0.25-1.0	2.1	0	142	0
1.1-3.0	4.7	0	373	0
3.1-9.0	5.3	1/ 0.5	423	1/ 55
9.1-20.0	0	1/ 2.0	0	1/ 161
20.1+	0	0	0	0
Total	12.1	2.5	938	1/ 216

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent)	79
Average duff and litter depth		(inches)	1.4
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent)	83
	lodgepole pine	(percent)	12
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	5

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	
Net volume cruised(M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	4,825
Stems remaining/acre	175
Basal area/acre before	436
Basal area/acre after	34
Average d.b.h. before (inches)	4
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	Crushed by Tomahawk

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MM

REMARKS

Residue loadings footnoted were present prior to thinning.

1/ See remarks.

5-PP-1-TH

DATA SHEET Residue descriptive code 5-PP-1-TH

LOADING				
Size class (inches)	Weight (tons/acre)		Volume (ft^3/acre)	
0.25-1.0	5.2	0	317	0
1.1-3.0	13.0	0	850	0
3.1-9.0	3.9	1/ 0.3	309	1/ 28
9.1-20.0	0	0	0	0
20.1+	0	0	0	0
Total	22.1	1/ 0.3	1,476	1/ 28

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.8
Ground area covered by residue 1/4-inch diameter and larger	(percent)	89
Average duff and litter depth	(inches)	0.7
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	98
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	2

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	
Net volume cruised (M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

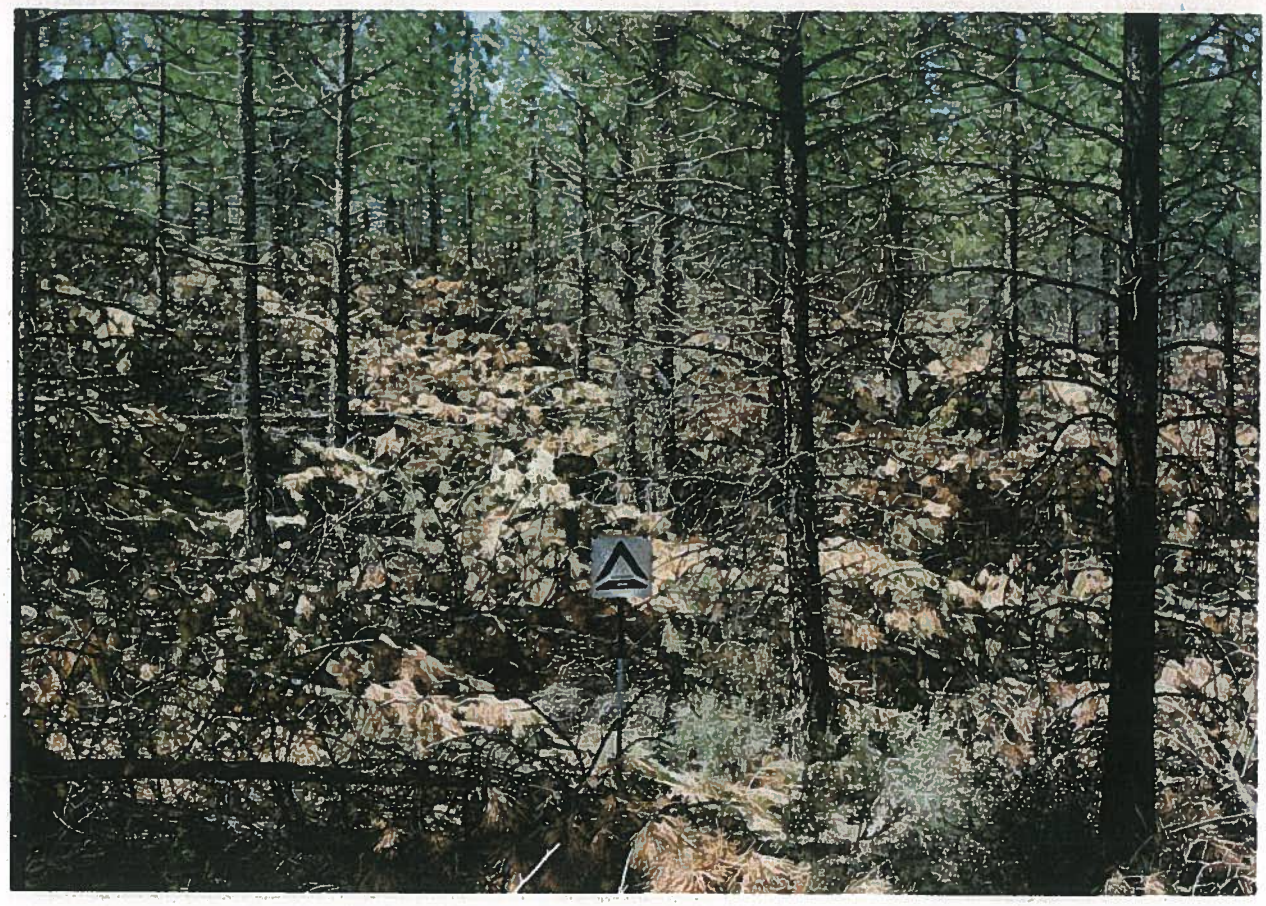
PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	11,850
Stems remaining/acre	150
Basal area/acre before	589
Basal area/acre after	30
Average d.b.h. before (inches)	3
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	Crushed by Tomahawk

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

Residue loadings footnoted were present prior to thinning.

1/ See remarks.



6-PP-1-TH

DATA SHEET — Residue description

LOADING				
Size class (inches)	Weight (tons/acre)		Volume (ft^3/acre)	
0.25-1.0	5.5	0	330	0
1.1-3.0	6.7	0	439	0
3.1-9.0	12.8	0	1,029	0
9.1-20.0	0	1/ 0.2	0	1/ 22
20.1+	3.5	0	283	0
Total	28.5	1/ 0.2	2,081	1/ 22

OTHER MEASUREMENTS		
Average residue depth	(feet)	1.8
Ground area covered by residue 1/4-inch diameter and larger	(percent)	85
Average duff and litter depth	(inches)	1.9
Sound residue 3.1-inch diameter and larger ponderosa pine	(percent)	99
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	1

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	
Net volume cruised (M fbm/acre)	
Average stems/acre cut	
Average d.b.h. of stems cut (inches)	
Stand age (years)	
Cutting prescription	
Yarding method	
Slash treatment	
Period since cut or treatment (months)	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	4,825
Stems remaining/acre	175
Basal area/acre before	436
Basal area/acre after	34
Average d.b.h. before (inches)	4
Average d.b.h. after (inches)	6
Thinning method	Chainsaw
Slash treatment	None

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	EE

REMARKS

Residue loadings footnoted were present prior to thinning.

1/ See remarks.

PONDEROSA PINE AND ASSOCIATED SPECIES

SIZE CLASS 4

PARTIAL CUT

A SERIES OF 8 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-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code 1-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	1.4	94
1.1-3.0	3.7	298
3.1-9.0	3.5	274
9.1-20.0	0	0
20.1+	0	0
Total	8.6	666

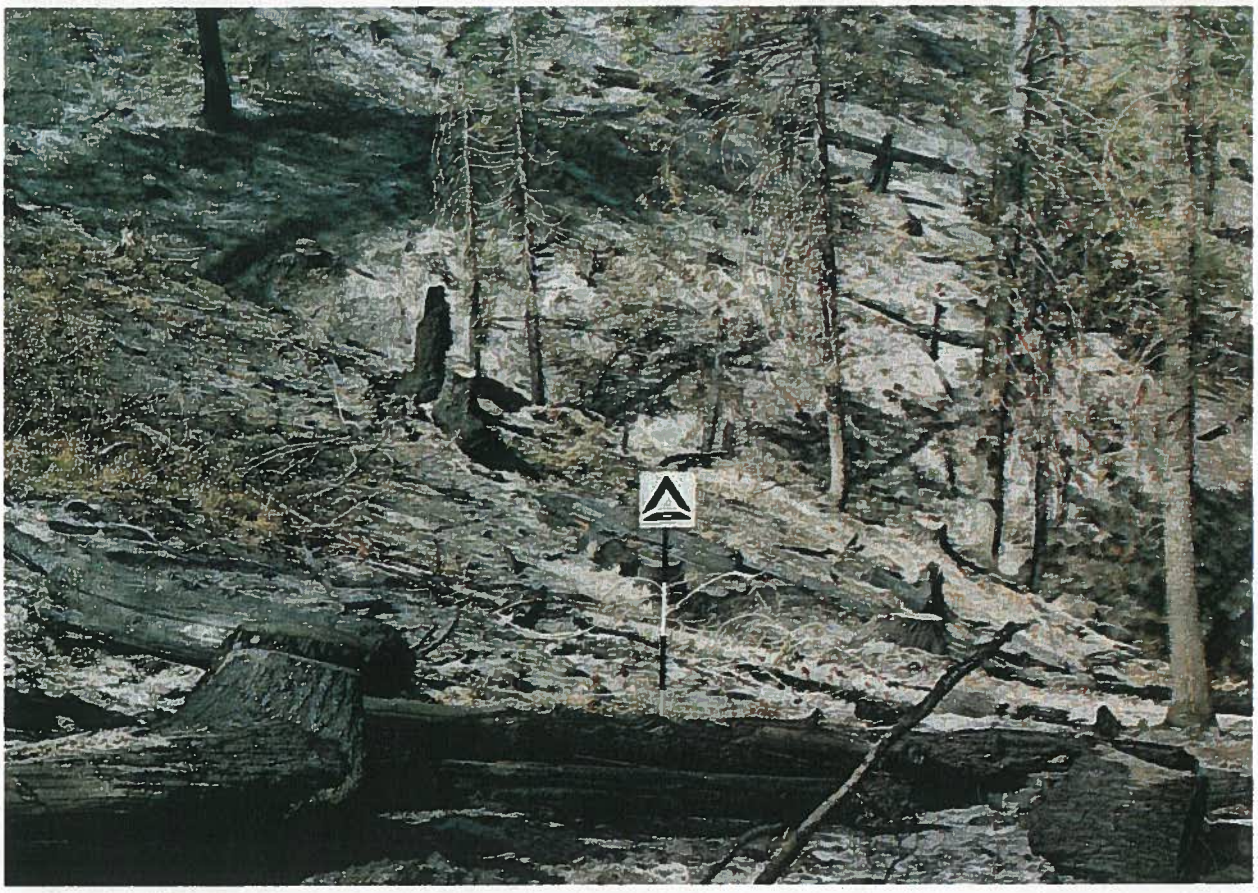
OTHER MEASUREMENTS		
Average residue depth		(feet) 0.2
Ground area covered by residue 1/4-inch diameter and larger		(percent) 57
Average duff and litter depth		(inches) 0.7
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent) 45
	ponderosa pine	(percent) 11
	other	(percent) 17
Rotted residue 3.1-inch diameter and larger		(percent) 27

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	28.0
Net volume cruised(M fbm/acre)	24.9
Average stems/acre cut	35
Average d.b.h. of stems cut (inches)	20
Stand age (years)	160+
Cutting prescription	Shelterwood
Yarding method	Tractor
Slash treatment	Machine piled & burned
Period since cut or treatment (months)	36

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	LL

REMARKS



2-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	0.4	27
1.1-3.0	2.3	185
3.1-9.0	2.7	212
9.1-20.0	4.2	343
20.1+	8.4	671
Total	18.0	1,438

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger		(percent)	28
Average duff and litter depth		(inches)	0.02
Sound residue 3.1-inch diameter and larger	white fir	(percent)	98
	Douglas-fir	(percent)	1
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	1

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	9.3
Net volume cruised(M fbm/acre)	5.9
Average stems/acre cut	11
Average d.b.h. of stems cut (inches)	26
Stand age (years)	250
Cutting prescription	Tree selection
Yarding method	High-lead
Slash treatment	Broadcast burned
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	LL
REMARKS	

3-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code 3-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.2	213
1.1-3.0	4.8	386
3.1-9.0	12.3	1,020
9.1-20.0	5.4	443
20.1+	0	0
Total	25.7	2,062

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent)	85
Average duff and litter depth		(inches)	5.0
Sound residue 3.1-inch diameter and larger	white fir	(percent)	89
	subalpine fir	(percent)	3
	other	(percent)	5
Rotted residue 3.1-inch diameter and larger		(percent)	3

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	7.0
Net volume cruised (M fbm/acre)	4.6
Average stems/acre cut	23
Average d.b.h. of stems cut (inches)	17
Stand age (years)	200+
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH
REMARKS	

4-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code 4-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.0	198
1.1-3.0	5.4	433
3.1-9.0	9.1	681
9.1-20.0	0	0
20.1+	11.7	781
Total	29.2	2,093

OTHER MEASUREMENTS		
Average residue depth		(feet) 0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent) 75
Average duff and litter depth		(inches) 2.0
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent) 78
	ponderosa pine	(percent) 14
	other	(percent) 1
Rotted residue 3.1-inch diameter and larger		(percent) 7

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	10.2
Net volume cruised (M fbm/acre)	10.0
Average stems/acre cut	110
Average d.b.h. of stems cut (inches)	14
Stand age (years)	80
Cutting prescription	Tree selection
Yarding method	Rubber-tired skidder
Slash treatment	Machine piled & burned
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

5-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.4	162
1.1-3.0	5.1	409
3.1-9.0	10.2	768
9.1-20.0	8.6	617
20.1+	3.0	200
Total	29.3	2,156

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger		(percent)	65
Average duff and litter depth		(inches)	0.7
Sound residue 3.1-inch diameter and larger	Douglas-fir	(percent)	73
	white fir	(percent)	9
	other	(percent)	2
Rotted residue 3.1-inch diameter and larger		(percent)	16

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	3.1
Net volume cruised(M fbm/acre)	2.0
Average stems/acre cut	17
Average d.b.h. of stems cut (inches)	15
Stand age (years)	200
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

6-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code 6-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	3.9	263
1.1-3.0	4.8	386
3.1-9.0	10.0	778
9.1-20.0	5.5	410
20.1+	6.9	458
Total	31.1	2,295

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.7
Ground area covered by residue 1/4-inch diameter and larger		(percent)	77
Average duff and litter depth		(inches)	0.7
Sound residue 3.1-inch diameter and larger	white fir	(percent)	43
	Douglas-fir	(percent)	33
	other	(percent)	22
Rotted residue 3.1-inch diameter and larger		(percent)	2

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	9.1
Net volume cruised(M fbm/acre)	8.0
Average stems/acre cut	41
Average d.b.h. of stems cut (inches)	15
Stand age (years)	170
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH
REMARKS	

7-PP&ASSOC-4-PC

DATA SHEET Residue descriptive code 7-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.6	176
1.1-3.0	5.9	474
3.1-9.0	27.1	1,874
9.1-20.0	2.3	196
20.1+	0	0
Total	37.9	2,720

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.6
Ground area covered by residue 1/4-inch diameter and larger		(percent)	89
Average duff and litter depth		(inches)	1.7
Sound residue 3.1-inch diameter and larger	western larch	(percent)	50
	white fir	(percent)	42
	other	(percent)	1
Rotted residue 3.1-inch diameter and larger		(percent)	7

HARVEST INFORMATION	
Gross volume cruised (M fbm/acre)	3.1
Net volume cruised (M fbm/acre)	2.0
Average stems/acre cut	17
Average d.b.h. of stems cut (inches)	15
Stand age (years)	200
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

8-PP&ASSOC-4-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.1	143
1.1-3.0	6.3	507
3.1-9.0	10.3	918
9.1-20.0	10.8	895
20.1+	11.6	930
Total	41.1	3,393

OTHER MEASUREMENTS			
Average residue depth		(feet)	0.4
Ground area covered by residue 1/4-inch diameter and larger		(percent)	64
Average duff and litter depth		(inches)	0.1
Sound residue 3.1-inch diameter and larger	ponderosa pine	(percent)	71
	white fir	(percent)	13
		(percent)	
Rotted residue 3.1-inch diameter and larger		(percent)	16

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	9.9
Net volume cruised(M fbm/acre)	9.1
Average stems/acre cut	9
Average d.b.h. of stems cut (inches)	27
Stand age (years)	300+
Cutting prescription	Tree selection
Yarding method	Tractor
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH

REMARKS

LODGEPOLE PINE

SIZE CLASS 3

CLEARCUT

1 LEVEL

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-LP-3-CC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	1.3	89
1.1-3.0	5.5	442
3.1-9.0	8.1	636
9.1-20.0	1.1	88
20.1+	0	0
Total	16.0	1,255

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger	(percent)	60
Average duff and litter depth	(inches)	0.4
Sound residue 3.1-inch diameter and larger lodgepole pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	5.5
Net volume cruised(M fbm/acre)	4.6
Average stems/acre cut	51
Average d.b.h. of stems cut (inches)	31
Stand age (years)	150
Cutting prescription	Clearcut
Yarding method	Tractor
Slash treatment	Machine crushed
Period since cut or treatment (months)	12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	MH

REMARKS

LODGEPOLE PINE

SIZE CLASS 3

PARTIAL CUT

A SERIES OF 5 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-LP-3-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	0.8	56
1.1-3.0	1.7	135
3.1-9.0	0.9	70
9.1-20.0	0	0
20.1+	0	0
Total	3.4	261

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.04
Ground area covered by residue 1/4-inch diameter and larger	(percent)	31
Average duff and litter depth	(inches)	0.1
Sound residue 3.1-inch diameter and larger lodgepole pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	7.6
Net volume cruised(M fbm/acre)	6.6
Average stems/acre cut	64
Average d.b.h. of stems cut (inches)	13
Stand age (years)	150
Cutting prescription	Shelterwood
Yarding method	Tractor
Slash treatment	Machine piled & burned
Period since cut or treatment (months)	24

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	LL

REMARKS

2-LP-3-PC

DATA SHEET Residue descriptive code 2-LP-3-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	1.9	127
1.1-3.0	5.1	407
3.1-9.0	3.4	263
9.1-20.0	4.1	319
20.1+	0	0
Total	14.5	1,116

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.2
Ground area covered by residue 1/4-inch diameter and larger	(percent)	64
Average duff and litter depth	(inches)	0.4
Sound residue 3.1-inch diameter and larger lodgepole pine	(percent)	100
	(percent)	
	(percent)	
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	3.6
Net volume cruised(M fbm/acre)	3.1
Average stems/acre cut	25
Average d.b.h. of stems cut (inches)	13
Stand age (years)	150
Cutting prescription	Shelterwood
Yarding method	Tractor
Slash treatment	Machine crushed
Period since cut or treatment (months)	36

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	LM

REMARKS

3-LP-3-PC

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	1.7	114
1.1-3.0	4.1	325
3.1-9.0	6.5	508
9.1-20.0	5.2	410
20.1+	0	0
Total	17.5	1,357

OTHER MEASUREMENTS		
Average residue depth		(feet) 0.3
Ground area covered by residue 1/4-inch diameter and larger		(percent) 61
Average duff and litter depth		(inches) 0.5
Sound residue 3.1-inch diameter and larger	lodgepole pine	(percent) 99
	ponderosa pine	(percent) 1
		(percent)
Rotted residue 3.1-inch diameter and larger		(percent) 0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	6.7
Net volume cruised(M fbm/acre)	6.2
Average stems/acre cut	18
Average d.b.h. of stems cut (inches)	10
Stand age (years)	80+
Cutting prescription	Overstory removal
Yarding method	Rubber-tired skidder
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HM

REMARKS

4-LP-3-PC

DATA SHEET

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.5	169
1.1-3.0	6.6	526
3.1-9.0	15.8	1,231
9.1-20.0	1.2	91
20.1+	0	0
Total	26.1	2,017

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.5
Ground area covered by residue 1/4-inch diameter and larger	(percent)	79
Average duff and litter depth	(inches)	0.7
Sound residue 3.1-inch diameter and larger lodgepole pine	(percent)	100
_____	(percent)	____
_____	(percent)	____
Rotted residue 3.1-inch diameter and larger	(percent)	0

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	3.2
Net volume cruised(M fbm/acre	2.0
Average stems/acre cut	23
Average d.b.h. of stems cut (inches)	12
Stand age (years)	110
Cutting prescription	Tree selection
Yarding method	Rubber-tired skidder
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	
Stems remaining/acre	
Basal area/acre before	
Basal area/acre after	
Average d.b.h. before (inches)	
Average d.b.h. after (inches)	
Thinning method	
Slash treatment	

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	HH

REMARKS

5-LP-3-PC

DATA SHEET Residue descriptive code _____

LOADING		
Size class (inches)	Weight (tons/acre)	Volume (ft^3/acre)
0.25-1.0	2.4	162
1.1-3.0	6.9	555
3.1-9.0	20.7	1,628
9.1-20.0	5.8	525
20.1+	0	0
Total	35.8	2,870

OTHER MEASUREMENTS		
Average residue depth	(feet)	0.5
Ground area covered by residue 1/4-inch diameter and larger	(percent)	85
Average duff and litter depth	(inches)	0.9
Sound residue 3.1-inch diameter and larger lodgepole pine	(percent)	86
_____	(percent)	____
_____	(percent)	____
Rotted residue 3.1-inch diameter and larger	(percent)	14

HARVEST INFORMATION	
Gross volume cruised(M fbm/acre)	3.6
Net volume cruised(M fbm/acre)	3.2
Average stems/acre cut	51
Average d.b.h. of stems cut (inches)	13
Stand age (years)	110
Cutting prescription	Tree selection 1/
Yarding method	Rubber-tired skidder
Slash treatment	None
Period since cut or treatment (months)	<12

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	_____
Stems remaining/acre	_____
Basal area/acre before	_____
Basal area/acre after	_____
Average d.b.h. before (inches)	_____
Average d.b.h. after (inches)	_____
Thinning method	_____
Slash treatment	_____

FUEL RATING	
U.S. Forest Service Region 6 fuel type identification	EE

REMARKS

All trees over 10 inches in diameter selected for cutting.

1/ See remarks.

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.

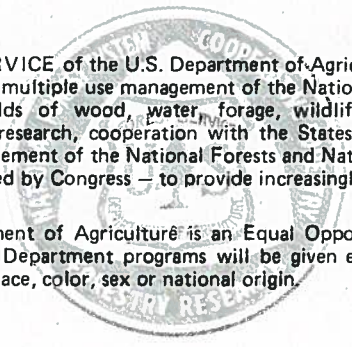
Within this overall mission, the Station conducts and stimulates research to facilitate and to accelerate progress toward the following goals:

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

Mailing address: *Pacific Northwest Forest and Range Experiment Station*
P.O. Box 3141
Portland, Oregon 97208



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.

The U.S. Department of Agriculture is an Equal Opportunity Employer. Applicants for all Department programs will be given equal consideration without regard to race, color, sex or national origin.