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Sites for Retrospective Studies: Opportunities for Research in Western Washington and Oregon

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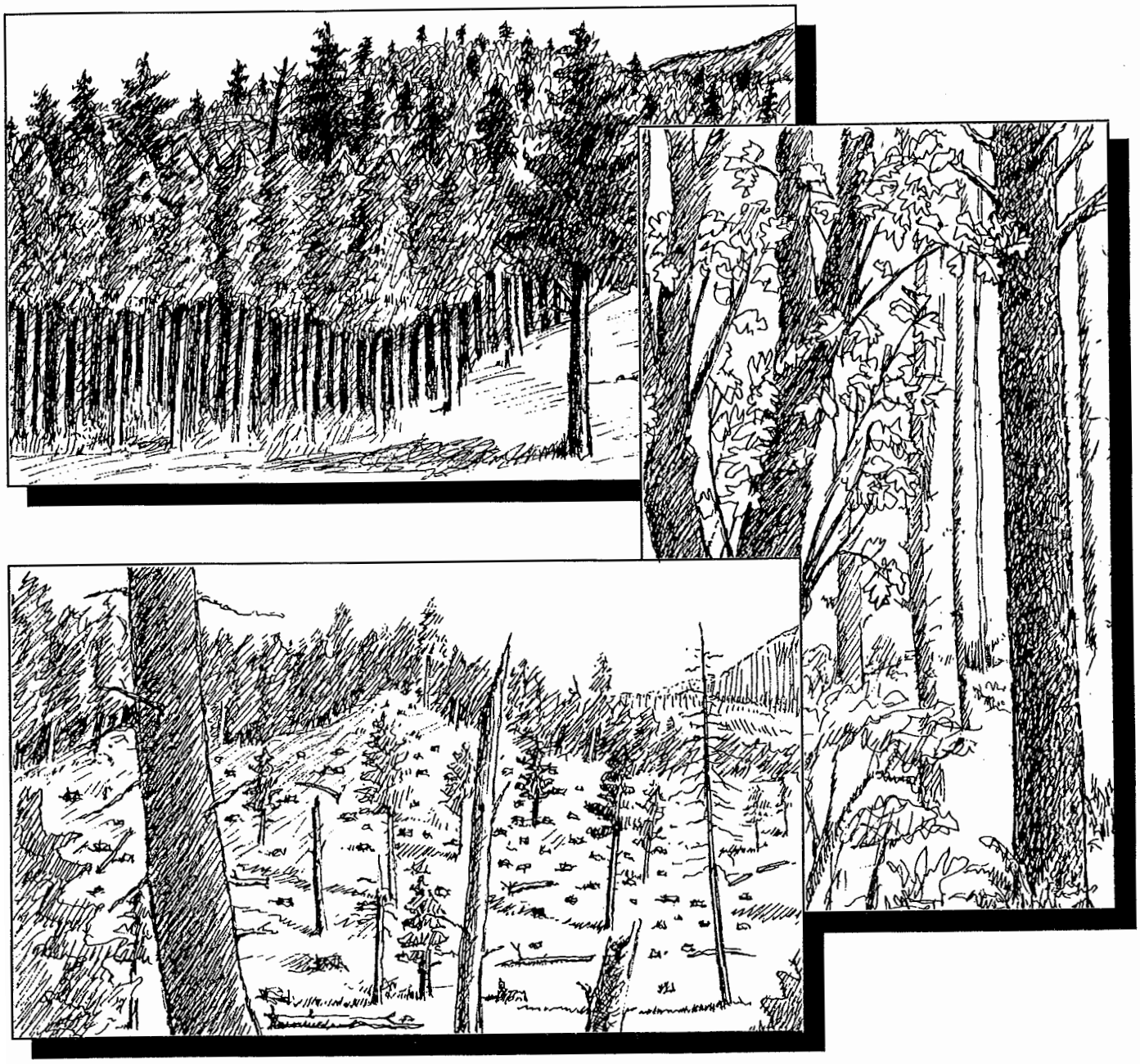

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Abstract

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Sites were identified on publicly managed and privately owned lands in western Oregon and Washington where research or demonstration of new forestry practices could be conducted by using a retrospective approach. One hundred and seventy-six stands were selected for this catalog to represent examples of the future condition that could be expected from new forestry practices. Information from these stands will serve to guide current management in developing alternative forestry practices. The stand types cataloged are characteristic of a range of structural conditions desirable for specific objectives that could be achieved with alternative forestry practices. Baseline information on overstory and understory composition and structure, amounts of coarse woody debris, disturbance history, past management activities, and landscape context of each stand was compiled in a database and is available to the forest research and management community. Information will aid researchers from many disciplines and managers by providing data about stand conditions and locations.

Keywords: New forestry, new perspectives, ecosystem management, retrospective studies, database, stand conditions.

Summary

One hundred and seventy-six forest stands suitable for retrospective studies were identified in western Oregon and Washington from an initial screening of more than 400 stands. Stands were identified on both publicly and privately managed lands so that they could be used for research sites or demonstration areas of new forestry practices. A database was compiled with information on stand vegetation and structural components, disturbance and management history, location, and the context from a local and landscape perspective. The database will facilitate research and management efforts by providing information on sites suitable for research and demonstration. Digital copies of the database and a text summary of data for each stand are available on diskette by request.

Contents

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Introduction

The views of U.S. society regarding forest lands, particularly public lands, and forest management practices have changed markedly during the past quarter century. Production of wood and other forest commodities remains significant, but the relative importance attached to other values (wildlife habitat, recreation, scenic beauty, and environmental protection) has increased. Rising expectations for other uses and values coupled with increased growth and urbanization of human populations have led to continuous, highly polarized conflicts over forest resources. The conflicts commonly involve allocation of forest land to various single or dominant uses and the practices by which such uses and values are attained. The conflicts point out shortcomings in existing approaches to forest land management and have stimulated a search for alternative practices. Ideally, alternative practices to management will improve opportunities to obtain essential commodities from the Nation's forests and maintain and enhance ecological and nonconsumptive forest values. Such practices include but need not be limited to those presently referred to as "new forestry," "extended rotations," "high-quality forestry," "new perspectives in forestry," and "ecosystem management."

Recently, there has been widespread adoption of some proposed alternative practices (for example, retention of large green trees and coarse woody debris) on National Forest land. There are few data, however, to indicate that the practices will lead to the desired outcome. Information is scanty on both future ecosystem development (that is, Will the practice lead to the desired stand structure?) and on the values that will be provided, given that the desired stand structure is attained.

Thorough, designed research studies are needed but may take decades to resolve such questions, yet managers must make decisions today. Retrospective studies of stands with attributes similar to those anticipated with new forestry practices can provide information to guide current management and help develop alternative forestry practices. Retrospective research will complement long-term experimental studies by providing data on the long-term effects of past natural disturbances (fire, wind, insects, and disease) or management on current stand structure. There also is a need to locate sites that represent or approximate a variety of future stand conditions to serve as examples or demonstrations for forest managers and forest users.

To help meet the need for useful study and demonstration areas, we searched for forest stands in western Oregon and Washington atypical of stand structure produced by traditional even-age management practices. Most of the stands we located developed as a result of natural disturbances or as unintended consequences of management activities. They represent a range of structural attributes considered desirable for some objectives and thus are indicative of conditions that might be sought and attained via alternative practices. This report provides background on our search and a brief description and catalog of 176 stands with potential for research and demonstration activity.

Scope

We surveyed stands on public and private forest lands throughout most of the Douglas-fir region. The search included forested areas dominated by Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) in six physiographic provinces: the Olympic Peninsula, northern Cascades, southern Washington Cascade Range, Puget Trough, the Coast Ranges of Oregon and southwestern Washington, and the western and high Cascades of Oregon (Franklin and Dyrness 1973). Forests of the southwestern Oregon Cascades and Siskiyous were not surveyed.

The survey area encompassed two major vegetation zones: the Western Hemlock Zone and the Pacific Silver Fir Zone (Franklin and Dyrness 1973). Western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) and Pacific silver fir (*Abies amabilis* Dougl. ex Forbes) are the climax tree species in forests of these zones. Douglas-fir is a major component in both zones as a result of past disturbance and its longevity as an overstory dominant; it also may be the climax species on drier sites.

Conventionally managed stands, ranging from recently planted clearcuts (early successional stage) to 60-year-old stands (stem exclusion stage), and natural old-growth stands will serve as important baselines or controls for evaluating advantages and disadvantages of alternative management practices. Such stands are abundant and easily located, however, and there is little need to catalog them for either research or demonstration purposes. Rather we concentrated on the less abundant, atypical stands generated by natural disturbance or uncommon management, or both. Among the larger disturbed areas that we surveyed were the extensive '21 Blow windthrow areas (1921) of coastal Washington, the Yacolt Burn (1902) in the southern Washington Cascades, and the Tillamook (1933, 1939, 1945) and Nestucca (1845) Burns in the northern Oregon Coast Ranges.

We surveyed National Forests (NF), other publicly managed lands, and private forest lands west of the Cascade Range from the Willamette NF in the south to the Mount Baker-Snoqualmie NF in the north (fig. 1). We focused on NF lands because of the shift within the Forest Service (FS) toward ecosystem management, but we attempted to sample other ownerships as well. Forest land managed by the Bureau of Land Management (BLM) in the Salem Region of Oregon, Washington Department of Natural Resources, Oregon Department of Forestry, the U.S. Army, industry (Plum Creek Timber Company, Weyerhauser Corp., and Champion International Paper Co.), and private holdings also were surveyed.

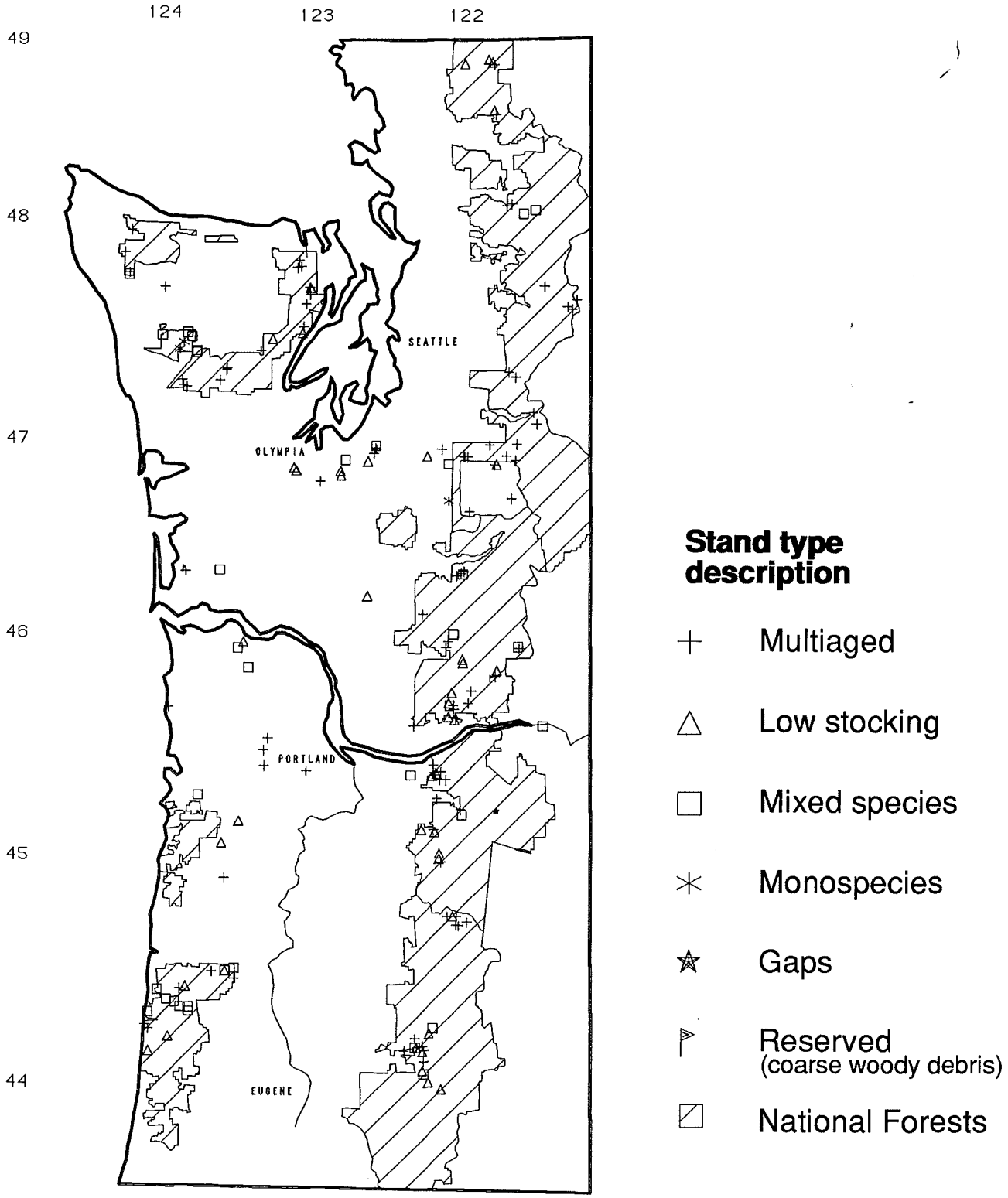

Figure 1—The location of stands, by stand type, selected for this study in western Washington and Oregon.

We attempted to locate stands representing each of the following stand conditions:

A. Stands with two (or more) age classes or multiple-canopy layers. Such stands commonly develop after several types of disturbance; they usually consist of large overstory dominants from the original stand and cohorts of young trees that have developed into one or more lower stories.

   Examples include the following situations:

   1. Low-intensity fires have left large residual live and dead trees.
   2. Major windstorms over large contiguous areas of forests have left scattered residual overstory trees.
   3. Past harvesting practices have left many residual trees. Many of these stands were logged in the early part of the 20th century in areas accessible by railroads.
   4. The overstory canopy of shelterwood stands has not been harvested.

B. Stands with less than full stocking. These most commonly occur in the following situations:

   1. Stands on gentle, accessible terrain have been repeatedly thinned or partially cut.
   2. Stands have repeated salvage from blowdown, beetle damage, or laminated root rot *(Phellinus weirii)* infections.
   3. Stands where low stocking has resulted from wide initial spacing, poor establishment, or extensive subsequent mortality.

C. Stands with mixed-species composition, particularly stands containing a high percentage of species for which we have little information, such as western redcedar (*Thuja plicata* Donn ex D. Don), true fir species, or hardwoods. These stands may have originated from:

   1. Natural regeneration.
   2. Planted stands with considerable natural regeneration of additional species.
   3. Stands intentionally planted with a mixture of species.
   4. Precommercially or commercially thinned stands where natural regeneration developed in openings and in heavily thinned areas.

D. Stands of relatively pure species composition, but of species for which biological and management information is limited. These include pure stands of:

   1. Western redcedar.
   2. True fir species.
   3. Bigleaf maple (*Acer macrophyllum* Pursh).

E. Stands with many small openings scattered throughout the stand, usually resulting from:

   1. Scattered windfalls (blowdown).
   2. Root rot pockets developed from *Armillaria mellea*, *Phellinus weirii*, or other pathogens that form gaps or pockets of mortality in the overstory canopy.
   3. Group selection or small patch cuttings.
   4. Tree kill caused by beetles or other insects.

F. Stands where "old-growth" structures intentionally were retained. To minimize similarity to other stand-type categories, we selected stands that were recently (since 1985) harvested with intent to retain coarse woody debris, snags, or green trees for future snag and log recruitment.

Survey Methods

Candidate stands for inclusion in the catalog initially were identified by personnel at Forest Service Ranger Districts or similar management units in other organizations. We contacted district silviculturalists or wildlife biologists and sent information on survey goals and procedures so that they would be able to assist us in selecting representative stands. Local personnel suggested stands with the desired stand conditions (described in the previous section) to meet survey criteria. We then screened candidate stands by examining aerial photographs and stand inventory data, such as the TRI (Total Resource Information) database for National Forest lands.

Many more stands were examined at district offices or in the field than were selected for inclusion in the final database. About 400 candidate stands were screened, from which 176 stands were cataloged. Stands not chosen for the database were rejected because (1) timber harvest or other activities were planned that would alter the stand; or (2) access to the stand was poor, thereby making the area difficult to survey in the time available.

Stands selected during the screening process then were examined in the field. When a candidate stand met our selection criteria, we collected appropriate data on a standardized field form. Detailed map directions to the stand were prepared. We also recorded much descriptive information about the stand, including its spatial context in terms of the age-class composition of the surrounding landscape; vegetation and structural composition; disturbance history; and past and future management activities. Data on composition and structure were obtained from reconnaissance surveys by traversing a majority of the stand. Sample measurements of tree sizes and species composition, dead wood components, and areas where vegetation or topography changed were noted and average values for stand variables were recorded. Dominant and codominant trees were classified as overstory; lower canopy trees were classified as intermediate and suppressed trees. Stand ages were estimated by selective increment coring of the largest trees, or by counting growth rings on large stumps in adjacent clearcuts. The number of standing dead and fallen trees was tallied by area for all stands. Standing dead and fallen trees were classified as soft or hard: soft material fell into decay classes 4 and 5, hard material in decay classes 1, 2, and 3. Stand context was described by the percentages of the stand boundary in various age classes and by percentages of forest age classes in a 750-hectare area centered around the stand.

Data were organized and entered into a dBASE IV relational database. The attributes of the forest stands and a description of the data variables surveyed are defined in appendix 1. A summary table of selected stand variables for all stands surveyed is in appendix 2. An abridged report of data for all the stands is presented in appendix 3, but a full report was produced from the database and is available on diskette along with the database.

Attributes of Selected Stands

Forest stands selected for inclusion in this catalog represent a wide range of site and stand conditions, sizes (hectares), and ages (fig. 2). The average size of stands was 93 hectares (range 4 to 2700 hectares). Stand ages ranged from 38 to 650 years. Stands in extensively harvested landscapes generally were smaller than 20 hectares, whereas a few stands on reserved lands in national parks or monuments were greater than 1000 hectares.

The vast majority of stands (77 percent) were on lands administered by the USDA Forest Service (fig. 3), primarily because our efforts were concentrated on NF Ranger Districts. State forest lands in Oregon and Washington had the second greatest number of stands surveyed (11 percent). Each of the remaining ownerships (U.S. Army, Oregon BLM, industrial, and private) represented less than 5 percent of the total stands surveyed (fig. 3).

Stand Types

Stands representing all the types (A through F) were located and are included in this catalog. The number of stands for each type and their proportion of the total does not represent relative presence on the landscape. Rather, it reflects the current interest and focus of individuals and organizations participating in the survey.

Multistoried stands—The majority of stands (92, or 52 percent) are multistoried stands having two or more tree age classes (type A, table 1). These multistoried stands originated from various disturbances, mostly fires or windstorms that destroyed most of the overstory and left only a few residual overstory trees. Other stands were products of seed-tree or shelterwood harvests in which residual trees were not removed. The mean density of all overstory species in multistoried stands was 111 trees/hectare (table 1). Estimated densities for Douglas-fir in multistoried stands were 57 trees/hectare (range 3-519 trees/hectare). The mean density of intermediate and suppressed trees in the lower canopy layer was 280 trees/hectare (table 2). Overstory dominants averaged 327 years old with mean heights of 50 meters and diameter at breast height (d.b.h.) of 91 centimeters. No ages were obtained for lower canopy trees, but their size averaged 19 meters in height and 28 centimeters d.b.h.

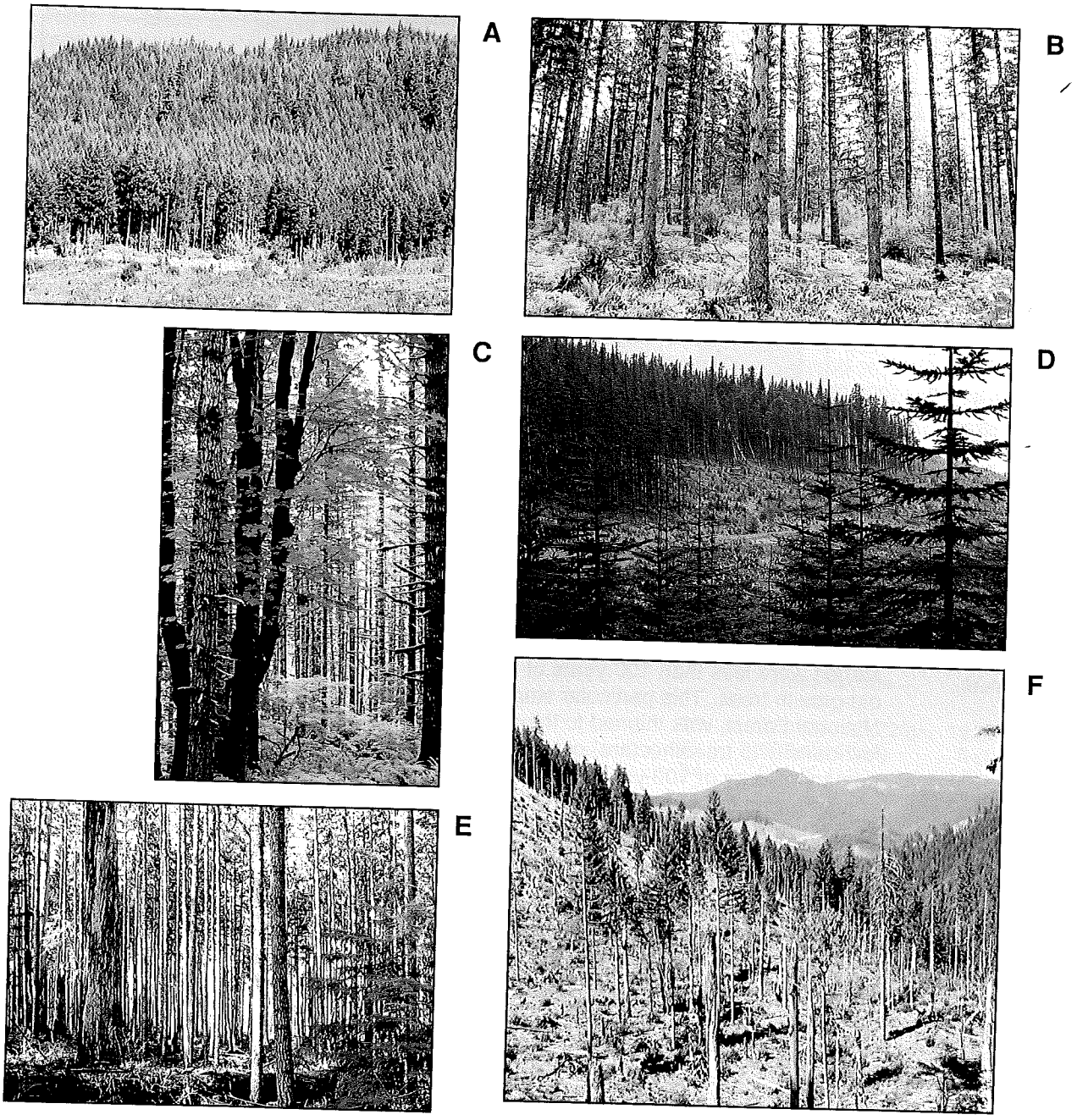

Figure 2—Examples of the stand type conditions that were surveyed in western Washington and Oregon. A = two-storied; B = thinned; C = mixed composition; D = monospecific; E = gaps; and F = CWD retained.

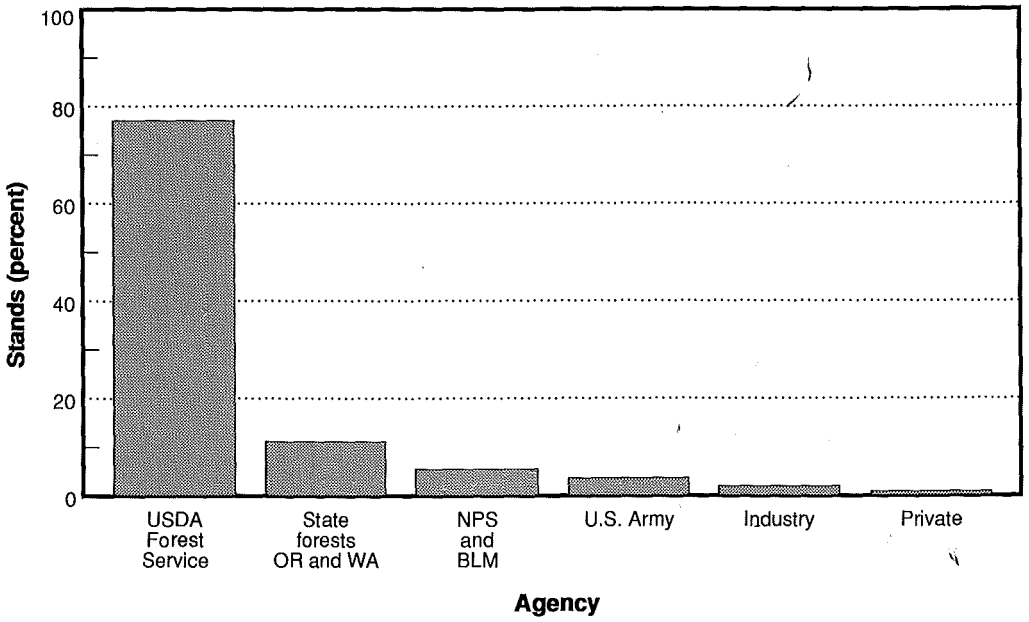

Figure 3—The frequency of stands surveyed by land ownership.

Low-density stands—Stands of less than full stocking accounted for 43 (24 percent) of the stands surveyed. Most of these resulted from thinning; 60 percent of these stands were less than 100 years of age. In only one case did a thinned stand contain old-growth trees. This particular stand in the Randle Ranger District, Gifford Pinchot National Forest, was thinned to improve forage for big game animals. It contained a low-density (5 trees/hectare) component of 500-year-old residual Douglas-fir, a primary canopy of 100-year-old codominant Douglas-fir (300 trees/hectare) with sparse grand fir (*Abies grandis* (Dougl. ex. D. Don) Lindl.) at 6 trees/hectare, and a third layer of advanced regeneration of western hemlock. Most stands, however, were thinned to improve the quality and size of the residual trees. On industrial lands, the stands were thinned at relatively young ages (35-50 years), with about one-third to one-half of the live-tree basal area removed and a planned final harvest about 10 years after thinning. Some stands, particularly on publicly managed lands, were thinned to improve or maintain scenic beauty in areas of high recreation use while providing a commodity and improving the quality and growth of the remaining trees.

Two areas with thinned stands deserve special mention—Port Blakely forests near McCleary and Elma, Washington, and the Black Rock Experimental Forest in the Coast Range of Oregon west of Corvallis. We did not collect detailed data for these stands, but much information is available from other sources. The stands occur on very productive sites and contain permanent plots where various experimental thinning densities have been evaluated over many decades. Sizes of individual trees, volumes harvested, and retained growing stock were high for the Port Blakely stands (O'Hara 1990). These thinned stands on good sites provide opportunities to assess long-term effects of management on various forest values and conditions.

Table 1—Mean and range in density, size, and age of overstory trees by stand type for stands surveyed for retrospective studies in western Oregon and Washington, 1990-91[a]

Stand type	No. of stands	Density		Mean for all species		
		Douglas-fir	All species	Age	Height	D.b.h.
		Trees/hectare		*Years*	*Meters*	*Centimeters*
A, 2-storied	92	57 (3-519)	111 (5-939)	327 (35-650)	50 (24-72)	91 (30-185)
B, low-stocking	43	210 (12-802)	260 (12-802)	144 (38-480)	41 (24-64)	61 (25-120)
C, mixed species	34	180 (2-865)	390 (7-963)	170 (16-999)	36 (6-64)	62 (12-150)
D, monospecific	3	50	375 (74-692)	293 (80-600)	51 (48-56)	92 (75-120)
E, gaps or small openings	2	2	252 (84-282)	225 (150-300)	44 (40-48)	85
F, coarse woody debris retained	2	3	12 (3-8)	250 (200-300)	38 (35-41)	90 (55-125)

[a] Ranges are shown in parentheses.

Table 2—Mean and range in density and size of understory trees by stand type for stands surveyed for retrospective studies in western Oregon and Washington, 1990-91[a]

Stand type	No. of stands	Density	Height	D.b.h.
		Trees/hectare	*Meters*	*Centimeters*
A, 2-storied	92	280 (163-12,720)	19 (2-48)	28 (1-90)
B, low stocking	43	857 (36-9880)	8 (1-24)	13 (1-60)
C, mixed species	34	340 (5-1124)	17 (1.5-40)	31 (2-90)
D, monospecific	3	630 (519-741)	17 (8-32)	38 (1-45)
E, gaps or small openings	2	672 (395-729)	8 (N/A)	20 (N/A)
F, coarse woody debris retained	2	1062 (951-1173)	20 (3-36)	20 (5-35)

[a] Ranges are shown in parentheses.

Mixed-species stands—Stands of mixed-species composition accounted for 32 (20 percent) of the surveyed stands. These stands were composed primarily of conifers with a high composition of red alder (*Alnus rubra* Bong.) and bigleaf maple. Twenty-one stands had mixtures of at least three conifer species and hardwoods, whereas 11 of the stands were dominated by red alder or bigleaf maple. Twenty mixed-species stands were less than 85 years old and had regenerated after clearcutting.

Other stand types—Each of the remaining stand types (pure stands, stands with small openings or gaps, and stands with intentionally retained old-growth structures) accounted for 2 percent or less of the total stands surveyed.

Table 3—Mean and range in density (pieces/hectare) and size of standing dead and fallen trees by stand type and hardness for stands surveyed for retrospective studies in western Oregon and Washington, 1990-91[a]

Stand type	No. of stands	Standing dead							Fallen trees		
		Density			Size of large snags				Density		Size
		Small (<25 cm)	Large (>25 cm)		Diameter		Height				
			Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Diameter
		– – – Snags/hectare – – –			*Centimeters*		*– – Meters – –*		*No./hectare*		*Centimeters*
A, 2-storied	92	80 (7-215)	29 (5-40)	29 (2-111)	76 (40-150)	56 (25-110)	4 (1.5-24)	11 (1-45)	40 (5-79)	50 (5-124)	61 (25-105)
B, low stocking	43	37 (5-64)	37 (5-57)	20 (5-32)	72 (45-125)	47 (25-105)	3 (2-10)	14 (2-36)	25 (3-62)	64 (45-112)	54 (30-85)
C, mixed species	34	37 (7-104)	54 (5-111)	17 (2-30)	82 (25-140)	43 (20-120)	4 (1-15)	10 (1-20)	42 (5-94)	54 (3-98)	57 (16-105)
D, monospecific	3	27 (20-37)	37 (20-64)	12 (10-15)	60 (21-80)	75 (35-110)	5 (2-12)	8 (6-10)	47 (20-99)	18 (15-20)	67 (60-70)
E, gaps or small-openings	2	12	5	7 (5-9)	63 (60-65)	70	3	5.5 (5-6)	14 (10-17)	9 (7-10)	55 (50-60)
G, coarse woody debris retained	2	4 (1-7)	20 (5-35)	4 (1-7)	93 (65-120)	35 (25-45)	4 (3.5-4)	16 (2-30)	50 (5-94)	17	65 (50-80)

[a] Ranges are shown in parentheses.

Numbers and Sizes of Standing Dead and Fallen Trees

For all stand types, the average number of small snags (< 25 centimeters) was 33/hectare with a range from 80 in the multistoried stands to 4 in stands where coarse wood was retained intentionally (table 3). An average of 21 large snags/hectare were tallied in all stands surveyed, with an average of 53 percent as soft snags and 47 percent as hard snags. Soft snags generally were larger in diameter than hard snags (75 vs. 54 centimeters), and hard snags were taller (10.8 meters) than soft snags (3.7 meters). Many stands contained few or no snags, especially those entered several times or where debris was piled and burned. Managed forests on the whole had fewer snags, primarily because of past management activities that removed snags as a result of concerns about fuel buildup and safety hazards to forest workers.[1]

[1] Atkinson, William A. May 4, 1990. Another view of new forestry. Paper delivered at Annual Meeting, Oregon Society of American Foresters, Eugene, OR.

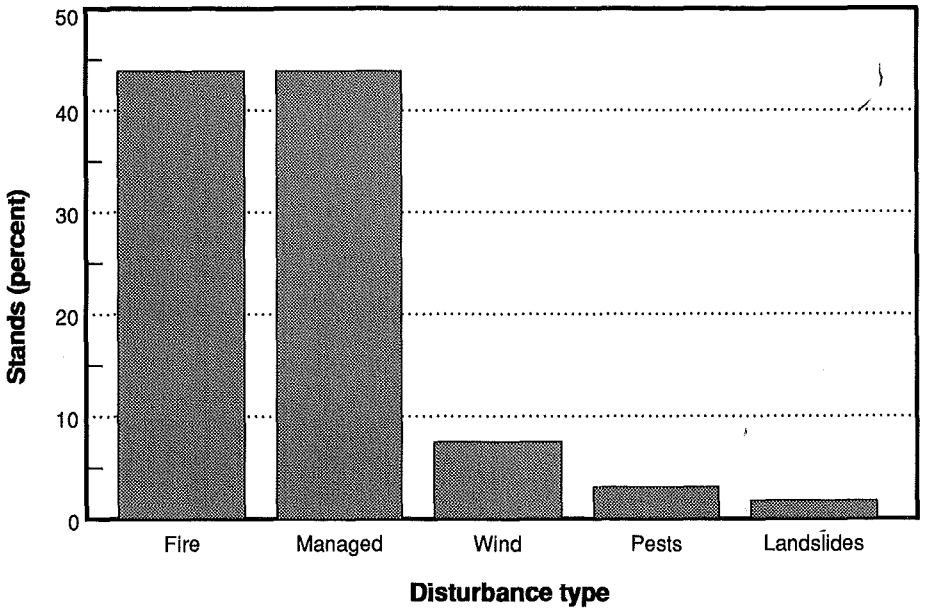

Figure 4—The frequency of natural disturbances or management history for the stands surveyed in this study.

Coarse woody debris or fallen trees on the forest floor averaged 36 pieces for all stand types surveyed. An average of 36 highly decayed fallen trees (decay classes 4 and 5) and 35 recently fallen trees (decay classes 1-3) were tallied. Stands with intentional retention of coarse woody debris contained the most soft pieces (50/hectare), and stands with low stocking of live trees contained the most hard fallen trees (64/hectare). The average diameter of all fallen trees (soft and hard) was 60 centimeters (table 3).

Stand Disturbance

Potential stands for retrospective study originated from various disturbances (fig. 4). Stands originating after fires and managed stands retaining a component of the original overstory each accounted for 44 percent (78 stands each) of the surveyed stands. The remainder of the stands originated from wind (8 percent), pests and pathogens (3 percent), and mudflows (< 2 percent).

Spatial Context of Stands

The spatial relation of forested stands to the surrounding landscape can influence the value of stands as wildlife habitat and thus their potential for use in demonstration and research. Surrounding landscapes ranged from recently clearcut lands to intact old-growth forests and intermediate stages of sapling-pole, young, and mature forests. Most stands that we surveyed were surrounded by forests of young and mature age classes. Young and mature forests averaged 52 percent of the area adjacent to the surveyed stands. Twenty percent of the adjoining stands were old-growth forest. Recent clearcuts and sapling-pole-stage clearcuts adjoined 27 percent of the stands. About 1 percent of the stands were at higher elevations with adjacent meadows (fig. 5).

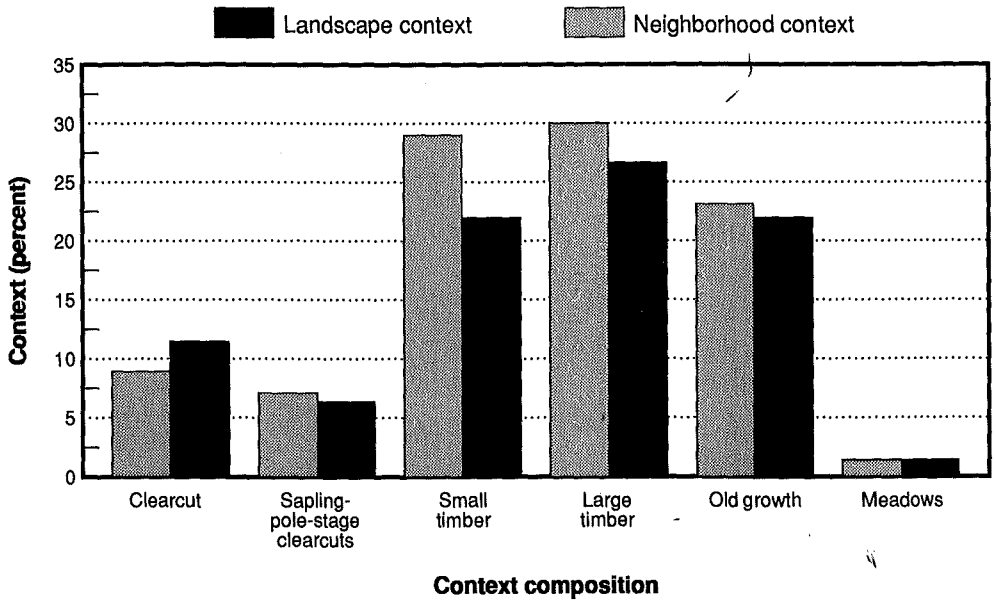

Figure 5—The age-class composition of forests in the immediate neighborhood and landscape adjacent to retrospective study stands.

Opportunities for Future Research

The stands cataloged in this report present opportunities to examine properties and values associated with various stand structure and to investigate how past disturbances and management produced stands of different structures. A group of contrasting stands could be visited in field tours for professional resource managers and for public information and education activities.

Formal retrospective studies may take several approaches. Research may evaluate or compare existing conditions and dependent values in various stands. This approach would provide an assessment of current conditions without investigating the stand-development processes that generated the existing pattern. Another research approach would use reconstructive techniques, such as stem analysis, to determine the growth patterns by which stands arrived at present conditions. A combination of the two approaches would provide data and insight on conditions desired for various objectives and management practices that will foster or accelerate the development of such desired conditions. Such work will be most informative and useful if atypical stands contained in the catalog are compared with typical managed and natural stands, all represented by a range of age classes.

To facilitate such demonstration and research activities, we offer this database to anyone who wishes to use it. Contact the Olympia Forestry Sciences Laboratory, 3625 93d Avenue SW, Olympia, Washington 98512, to receive database files, a text summary of data, and supporting documents.

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O'Hara, K.L. 1990. Twenty-eight years of thinning at several intensities in a high-yield Douglas-fir stand in western Washington. Western Journal of Applied Forestry. 5(2): 37-40.

Appendix 1

The attributes were recorded for forest stands selected as suitable for retrospective studies. Field names are dBase IV database variable names.

Field name	Definition
STATE	State
COUNTY	County
TWNSHIP	Township
RANGE	Range
SECTION	Section
OWNERSHIP	Who administers land (for example, USDA Olympic NF, Washington Department of Natural Resources, Plum Creek Timber Company)
RANGERDIST	Ranger District
STAND-DESI	Designation of stand area (1-10) to designate the larger (regional) geographic setting and a secondary number for each discrete stand
STAND TYPE	A letter designator to identify stand structure and condition (A-F)
STAND	Stand number within the database
TRI-COMP	USDA compartment name from TRI files; only applies to FS lands
TRI-CELL	USDA cell number for stand from TRI files
PHOTO_NO	Includes line number and number of aerial photograph of the stand
PHOTO_DATE	Date of photo
PHOTO_SCALE	Scale of aerial photograph (usually 1:12000)
TOWN	Name of the nearest town
DIST_TOWN	Distance to the nearest town
MAP_NAME	Name of map (for example, Quilcene Brownline or Skykomish Firemans)
USGS_QUAD	USGS 7.5- or 15-minute quad. map name
SIZE_AREA	The size of the stand in hectares
SHAPE	Geometry of the stand area
SLOPE	Percentage of steepness of slope measured with a clinometer
ASPECT	Azimuth or direction stand faces
ELEV_METER	Average elevation in meters
TOPO_POS	Position on slope designated as L=lower 1/3 of slope, M=middle 1/3 of slope, U=upper 1/3 of slope
SOIL_TYPE	Generalized description of the soils
STD_MOIST	Apparent moisture regime of the stand determined by indicator understory plants

The following variables describe the surrounding context of the stand: ST=stand, LS=landscape. These measurements generally were taken from the aerial photograph of the stand. The stand measurement is an estimate of what percentage of the perimeter of the study stand is adjacent to a particular successional state. The landscape context was estimated in a 750-hectare area encompassing the stand. Age classes are CC=recent clearcut, CC_SP=clearcut in sapling stage, CC_POLE=clearcut in pole stage, Y_SMT=young stand with small timber, MAT_LT=mature stand with large timber, OG=old-growth, and MEADOW=meadow.

ST_CC	Percentage of the stand surrounded by recent clearcuts
LS_CC	On a landscape basis, what percentage of the surrounding area is in recent clearcuts
ST_CC_SAPS/POLE	Percentage of stand surrounded by sapling and pole-size timber
LS_CC_SAPS/POLE	Percentage of LS in sapling and pole-size timber
ST_Y_SMT	Percentage of the stand surrounded by young stands
LS_Y_SMT	Percentage of LS in young stands
ST_MAT_LT	Percentage of the stand surrounded by mature timber includes large sawtimber (>53 centimeters d.b.h.)
LS_MAT_LT	Percentage of LS in mature forest with large sawtimber as a major component of the stand
ST_OG	Percentage of the stand surrounded by old growth
LS_OG	Percentage of LS in old-growth forests as a major component of the surrounding stand
ST_MEADOW	Percentage of the stand surrounded by meadows
LS_MEADOW	What percent of LS is meadow

The following three variables document the observer and the contacts made at the Ranger District level.

NP_EXAMDAT	The date of the retrospective study survey
NP_PERSONNEL	Observer's name
RD_CONTACT	The contact at the local level

The following variables describe the vegetation of the site.

CAN_LAYERS	A visual estimate of the canopy(s), usually listed as uneven- or even-aged
NUM_LAYERS	Number of distinct canopy layers
PLANT_ASSO	The plant association based on known plant associations developed for the specific NF where the stand was located
DOM_OS_SP1	Species of the dominant or codominant overstory (OS) tree
OS_DEN_1	Density of the dominant OS species
DOM_OS_SP2	Species of a second overstory dominant or codominant tree
OS_DEN_2	Density of the second OS species
DOM_OS_SP3	Species of a third dominant or codominant overstory tree
OS_DEN_3	Density of the third OS species
DOM_OS_SP4	Species of a fourth dominant or codominant overstory tree
OS_DEN_4	Density of the fourth OS species
DOM_OS_AGE	Age of the overstory dominants, usually Douglas-fir

CORE_AGE	Tree age, if an increment core age was taken
DOM_HT	Average height of the overstory dominant species, in most cases, Douglas-fir
DBH_DOM	An estimate of the average diameter at breast height of the overstory species

The following variables designate the species and density of trees in the lower canopy (intermediate or suppressed position) in the stand. These trees normally represent a regeneration layer that has become established beneath the canopy layer of the residual or primary overstory trees in the stand.

SDOM_SP1	Primary species of intermediate and suppressed tree
SDOM_DEN_1	Density of the primary intermediate and suppressed species
SDOM_SP2	Species of a second species found in the intermediate and suppressed canopy position
SDOM_DEN_2	Density of second species in an intermediate and suppressed position
SDOM_SP3	Species of a third species in an intermediate and suppressed canopy position
SDOM_HT	Average height of the intermediate and suppressed species
SDOM_DBH	Average d.b.h. of intermediate and suppressed

The following 12 variables identify the major understory plants within the stand. These plants generally are the indicator plants for the stand and are used to classify the vegetation into known plant associations.

VEG_COV_1	Species and percentage of cover of plants in stand
VEG_COV_2	Species and percentage of cover
VEG_COV_3	Species and percentage of cover
VEG_COV_4	Species and percentage of cover
VEG_COV_4	Species and percentage of cover
VEG_COV_5	Species and percentage of cover
VEG_COV_6	Species and percentage of cover
VEG_COV_7	Species and percentage of cover
VEG_COV_8	Species and percentage of cover
VEG_COV_9	Species and percentage of cover
VEG_COV_10	Species and percentage of cover
VEG_COV_11	Species and percentage of cover
VEG_COV_12	Species and percentage of cover

The following variables describe the species and density of small snags (<25 centimeters) and of large soft and hard snags, and the size of large snags (>25 centimeters).

SNAG1_SPSM	Species of small snags in the stand
SD1_DEN_SM	Standing-dead density for small snags
SNAG2_SPSM	Second species of small snags
SD2_DEN_SM	Standing-dead density of the second species of small snags
SNAG_DEN_SOFT	Average density of large soft snags/hectare (>25 centimeters); snags in decay classes 4/5
SOFT_SIZE	Average diameter
SOFT_HT	Average height of large soft snags (meters)

SNAG_DEN_HARD	Average density of large hard snags/acre (>25 centimeters); snags in decay classes 1-3
HARD_SIZE	Average diameter
HARD_HT	Average height of large hard snags (meters)

The following variables refer to the density and size of coarse woody debris (CWD) within the stand.

CWD_DEN	Density of large logs (per hectare) for all species combined
CWD_SOFT	The density of logs in decay classes 4 and 5
SOFT_CvsR	Soft logs from residual or current stand
CWD_HARD	Density of hard logs
HARD_CvsR	Hard logs from current or residual stand
CWD_AVDIAM	Average diameter of large logs
STAND_HIST	Single-value designator for the primary form of disturbance for the stand: F=fire
HARV_METH	If the stand was logged
REG_METH	Regeneration method used: N=natural regeneration
SITE_PREP	Site preparation for the stand before reforestation (planting)
POST_PLANT	Postplanting treatment: PCT=precommercial thin
LV_TR_SPAC	Leave tree spacing after postplanting treatment
ST_EXAM_DT	The date of a stand examination by local personnel
RES_ACTIV	Any research activity in the stand
RES_CONT	Contact for research activity
DIRECTION	Memo field describing the directions to the stand.
DESCRIPTION	Memo field describing the stand conditions and characteristics.

Appendix 2

Table 4—Summary data for stands identified as suitable during 1990 and 1991 for retrospective studies in western Oregon and Washington

Stand type	Ownership	County	State	Area	Elev.	Canopy layers	Overstory			Lower canopy	Snag dens.		CWD	Stand hist.[b]	Stand no.
							Spp.[a]	No./ha	Age		Soft	Hard			
				Ha	*m*				*Yr*		*No./hectare*				
A	OR Dept. Forestry	Washington	OR	45	325	2	PSME	7	165	PSME	12	61	64	F	1138
A	OR Dept. Forestry	Washington	OR	47	540	3	PSME	10	85	PSME	10	43	25	F	1141
A	OR Dept. Forestry	Washington	OR	21	465	2	PSME	10	105	PSME	7	24	15	F	1142
A	OR State Parks	Clatsop	OR	20	135	3	PISI	15	350	TSHE	12	18	52	F	1161
A	Mount Hood NF	Clackamas	OR	10	490	2	PSME	5	500	PSME	10	31	20	F	1012
A	Mount Hood NF	Clackamas	OR	40	320	2	PSME	5	400	TSHE	0	0	0	F	1036
A	Mount Hood NF	Clackamas	OR	40	625	2	PSME	44	400	TSHE	17	79	12	F	1047
A	Mount Hood NF	Clackamas	OR	101	790	2	PSME	40	400	TSHE	5	24	30	F	1048
A	Mount Hood NF	Clackamas	OR	19	580	2	PSME	5	275	PSME	7	6	25	L	1145
A	Mount Hood NF	Clackamas	OR	49	780	3	PSME	7	55	PSME	20	61	86	F	1149
A	Mount Hood NF	Multnomah	OR	20	550	2	PSME	25	400	TSHE	0	0	0	W	1035
A	Mount Hood NF	Multnomah	OR	24	365	2	PSME	7	400	PSME	0	0	0	F	1037
A	Mount Hood NF	Multnomah	OR	51	685	2	TSHE	49	300	TSHE	7	18	40	W	1042
A	Mount Hood NF	Multnomah	OR	81	425	2	PSME	17	400	PSME	5	43	30	W	1044
A	Mount Hood NF	Multnomah	OR	20	300	2	PSME	40	400	TSHE	7	31	30	W	1045
A	Siuslaw NF	Benton	OR	57	380	2	PSME	222	200	PSME	5	18	10	F	1082
A	Siuslaw NF	Lane	OR	2105	152	3	PISI	321	85	PISI	30	12	40	F	1111
A	Siuslaw NF	Lane	OR	2024	490	2	PSME	519	85	TSHE	7	12	20	F	1112
A	Siuslaw NF	Lincoln	OR	18	185	2	PSME	5	150	PSME	0	18	22	F	1079
A	Siuslaw NF	Lincoln	OR	162	595	3	PSME	7	500	PSME	30	31	37	F	1109
A	Willamette NF	Marion	OR	16	1000	2	PSME	37	325	PSME	15	55	15	L	1155
A	Willamette NF	Lane	OR	81	790	2	PSME	10	300	PSME	20	6	44	F	1102
A	Willamette NF	Lane	OR	71	390	2	PSME	17	450	PSME	7	31	57	F	1103
A	Willamette NF	Lane	OR	53	290	2	PSME	49	450	PSME	12	24	25	F	1105
A	Willamette NF	Lane	OR	16	350	2	PSME	25	500	PSME	5	31	12	L	1106
A	Willamette NF	Lane	OR	89	550	2	PSME	37	450	PSME	7	49	37	F	1107
A	Willamette NF	Lane	OR	18	760	2	PSME	247	90	PSME	5	49	59	F	1178
A	Willamette NF	Marion	OR	36	625	2	PSME	12	350	PSME	37	43	86	F	1093
A	Willamette NF	Marion	OR	18	1340	2	PSME	27	325	TSHE	0	31	20	L	1153
A	Willamette NF	Marion	OR	14	760	2	PSME	86	90	PSME	0	31	37	L	1154
A	Willamette NF	Marion	OR	162	1010	2	PSME	37	325	PSME	10	43	22	L	1156
A	BLM	Polk	OR	77	610	3	PSME	86	190	PSME	12	49	54	F	1170
A	McIntosh Forest	Thurston	WA	18	65	2	PSME	272	70	PSME	5	49	17	L	1179
A	Plum Creek	Pierce	WA	26	365	2	PSME	7	400	PSME	7	6	22	F	1032
A	U.S. Army	Pierce	WA	81	90	2	PIPO	20	110	PIPO	0	12	7	F	1123
A	U.S. Army	Pierce	WA	31	90	2	PSME	10	85	PSME	0	0	12	L	1125
A	U.S. Army	Pierce	WA	42	90	2	PSME	5	85	PSME	0	6	15	L	1127
A	Gifford Pinchot NF	Lewis	WA	32	350	3	PSME	7	650	PSME	0	24	20	F	1090
A	Gifford Pinchot NF	Lewis	WA	81	730	2	PSME	5	650	PSME	15	18	35	L	1091
A	Gifford Pinchot NF	Skamania	WA	4	434	2	PSME	25	450	TSHE	0	0	37	S	1021
A	Gifford Pinchot NF	Skamania	WA	4	400	2	PSME	49	450	TSHE	2	0	25	S	1028
A	Gifford Pinchot NF	Skamania	WA	20	960	2	PSME	25	265	PSME	0	0	15	L	1132
A	Gifford Pinchot NF	Skamania	WA	14	930	2	PSME	37	275	PSME	0	6	32	L	1135
A	Gifford Pinchot NF	Skamania	WA	49	475	3	PSME	10	210	PSME	17	43	104	F	1164
A	Gifford Pinchot NF	Skamania	WA	239	520	3	PSME	5	260	PSME	20	31	94	F	1165
A	Gifford Pinchot NF	Skamania	WA	10	487	3	PSME	7	210	PSME	12	104	124	F	1166
A	Gifford Pinchot NF	Skamania	WA	61	505	2	PSME	37	230	PSME	10	61	37	F	1167
A	Gifford Pinchot NF	Yakima	WA	10	1010	2	PSME	15	175	PSME	2	43	42	L	1137
A	Mount Baker-Snoqualmie NF	King	WA	20	480	2	PSME	20	250	TSHE	15	24	86	F	1004
A	Mount Baker-Snoqualmie NF	King	WA	61	700	2	PSME	12	250	PSME	10	12	40	F	1005
A	Mount Baker-Snoqualmie NF	King	WA	61	610	2	PSME	296	300	TSHE	12	18	40	F	1006
A	Mount Baker-Snoqualmie NF	King	WA	30	1160	2	TSME	247	400	ABAM	10	12	20	F	1016

Table 4—Summary data for stands identified as suitable during 1990 and 1991 for retrospective studies in western Oregon and Washington (continued)

Stand type	Ownership	County	State	Area	Elev.	Canopy layers	Overstory Spp.[a]	Overstory No./ha	Overstory Age	Lower canopy	Snag dens. Soft	Snag dens. Hard	CWD	Stand hist.[b]	Stand no.
				Ha	*m*				*Yr*		*No./hectare*				
A	Mount Baker-Snoqualmie NF	Kittitas	WA	30	1050	2	PSME	25	200	PSME	22	37	25	F	1033
A	Mount Baker-Snoqualmie NF	Kittitas	WA	61	760	2	PSME	25	200	PSME	7	92	30	F	1034
A	Mount Baker-Snoqualmie NF	Pierce	WA	101	760	2	PSME	5	400	PSME	20	12	99	L	1029
A	Mount Baker-Snoqualmie NF	Pierce	WA	101	810	2	PSME	5	400	PSME	20	12	86	L	1030
A	Mount Baker-Snoqualmie NF	Pierce	WA	49	1006	3	PSME	62	400	TSHE	17	37	62	F	1031
A	Mount Baker-Snoqualmie NF	Pierce	WA	61	1250	2	PSME	15	500	ABAM	30	61	35	F	1052
A	Mount Baker-Snoqualmie NF	Pierce	WA	16	975	2	PSME	37	150	PSME	5	18	30	A	1053
A	Mount Baker-Snoqualmie NF	Pierce	WA	61	1210	2	ABAM	22	225	ABAM	7	12	25	F	1054
A	Mount Baker-Snoqualmie NF	Pierce	WA	61	750	2	PSME	7	300	TSHE	5	6	25	F	1055
A	Mount Baker-Snoqualmie NF	Skykomish	WA	49	770	2	TSHE	62	350	TSHE	7	6	22	F	1009
A	Mount Baker-Snoqualmie NF	Snohomish	WA	14	610	2	PSME	309	35	PSME	30	275	47	L	1063
A	Mount Baker-Snoqualmie NF	Snohomish	WA	49	365	2	PSME	259	150	TSHE	10	37	20	L	1065
A	Mount Baker-Snoqualmie NF	Whatcom	WA	121	690	3	THPL	40	500	TSHE	12	43	40	F	1051
A	Mount Baker-Snoqualmie NF	Whatcom	WA	5	275	2	PSME	111	250	TSHE	10	24	30	L	1062
A	Olympic NF	Clallam	WA	65	328	2	THPL	37	135	PSME	10	12	30	F	1015
A	Olympic NF	Clallam	WA	81	760	2	PSME	74	280	PSME	15	12	40	F	1017
A	Olympic NF	Clallam	WA	51	880	3	PSME	99	280	THPL	5	0	35	F	1018
A	Olympic NF	Clallam	WA	14	760	2	PSME	12	280	PSME	5	0	37	F	1019
A	Olympic NF	Clallam	WA	81	185	2	TSHE	642	75	TSHE	0	140	49	F	1117
A	Olympic NF	Clallam	WA	142	305	2	PSME	5	500	TSHE	35	49	79	W	1118
A	Olympic NF	Clallam	WA	243	170	2	TSHE	10	500	TSHE	17	73	44	W	1120
A	Olympic NF	Grays Harbor	WA	8	300	2	THPL	20	300	TSHE	5	37	30	S	1024
A	Olympic NF	Grays Harbor	WA	40	240	2	PSME	5	300	PSME	15	37	40	F	1025
A	Olympic NF	Grays Harbor	WA	16	290	2	PSME	15	300	TSHE	5	18	25	S	1026
A	Olympic NF	Grays Harbor	WA	2	98	2	TSHE	618	80	TSHE	15	18	30	W	1066
A	Olympic NF	Grays Harbor	WA	81	105	1	TSHE	618	80		40	37	62	W	1068
A	Olympic NF	Grays Harbor	WA	28	195	2	TSHE	395	80	TSHE	35	24	17	L	1069
A	Olympic NF	Jefferson	WA	32	740	2	PSME	37	100	TSHE	5	6	40	F	1008
A	Olympic NF	Jefferson	WA	101	460	2	PSME	86	280	TSHE	25	37	62	F	1039
A	Olympic NF	Jefferson	WA	81	850	2	TSHE	185	280	TSHE	27	18	20	F	1041
A	Olympic NF	Jefferson	WA	49	700	2	PSME	7	250	PSME	20	18	91	F	1122
A	Olympic NF	Mason	WA	16	250	2	PSME	247	100	PSME	5	0	12	L	1007
A	Wenatchee NF	Chelan	WA	40	1160	2	TSHE	37	400	TSHE	5	6	15	F	1010
A	Mora NP	Pierce	WA	49	850	2	PSME	25	250	PSME	10	12	30	F	1020
A	Mora NP	Thurston	WA	2711	850	2	PSME	7	550	PSME	20	31	25	L	1002
A	Olympic NP	Jefferson	WA	49	215	2	PSME	12	600	PSME	7	43	40	F	1078
A	DNR	Clark	WA	61	580	2	PSME	124	85	PSME	5	0	27	F	1176
A	DNR	Pacific	WA	30	75	2	THPL	12	300	TSHE	10	0	79	W	1059
A	DNR	Skamania	WA	65	450	2	PSME	7	250	PSME	22	49	62	F	1173
A	DNR	Skamania	WA	91	510	2	PSME	5	250	PSME	12	37	126	F	1174
A	DNR	Skamania	WA	51	625	2	PSME	15	500	TSHE	20	49	86	F	1143
A	Gifford Pinchot NF	Lewis	WA	51	380	2	PSME	7	650	PSME	20	31	42	F	1089
B	OR Dept. Forestry	Clatsop	OR	28	620	2	PSME	222	58	TSHE	15	12	59	L	1158
B	Mount Hood NF	Clackamas	OR	20	610	2	PSME	321	50	TSHE	57	12	67	L	1144
B	Mount Hood NF	Clackamas	OR	12	550	2	PSME	395	45	TSHE	7	31	64	L	1146

Table 4—Summary data for stands identified as suitable during 1990 and 1991 for retrospective studies in western Oregon and Washington (continued)

Stand type	Ownership	County	State	Area	Elev.	Canopy layers	Overstory Spp.[a]	Overstory No./ha	Overstory Age	Lower canopy	Snag dens. Soft	Snag dens. Hard	CWD	Stand hist.[b]	Stand no.
				Ha	*m*				*Yr*		*No./hectare*				
B	Mount Hood NF	Clackamas	OR	13	790	2	PSME	741	55	TSHE	12	6	72	L	1147
B	Mount Hood NF	Clackamas	OR	377	640	2	PSME	803	55	TSHE	10	12	37	L	1148
B	Mount Hood NF	Multnomah	OR	12	655	2	PSME	12	400	PSME	0	0	0	W	1038
B	Mount Hood NF	Multnomah	OR	20	340	2	PSME	20	120	TSHE	15	31	20	W	1046
B	Siuslaw NF	Benton	OR	20	305	1	PSME	272	85		12	12	30	P	1083
B	Siuslaw NF	Lane	OR	81	145	1	PSME	272	35		20	0	22	L	1113
B	Siuslaw NF	Lane	OR	202	390	2	PSME	272	100	TSHE	37	12	44	L	1114
B	Siuslaw NF	Lincoln	OR	73	520	1	PSME	432	90		12	6	20	L	1110
B	Willamette NF	Lane	OR	6	685	2	PSME	20	480	PSME	5	12	7	L	1095
B	Willamette NF	Lane	OR	28	360	3	PSME	25	450	PSME	10	37	25	L	1097
B	Willamette NF	Lane	OR	81	850	2	PSME	198	125	PSME	0	18	15	L	1098
B	Willamette NF	Lane	OR	2	725	2	PSME	30	400	PSME	0	6	10	L	1099
B	Willamette NF	Lane	OR	14	640	2	PSME	25	450	PSME	7	24	30	L	1101
B	Willamette NF	Lane	OR	23	700	2	PSME	296	100	PSME	0	12	15	L	1104
B	Willamette NF	Marion	OR	34	915	2	PSME	235	85	PSME	5	6	22	L	1092
B	BLM	Tillamook	OR	71	510	3	PSME	111	110	PSME	20	37	49	L	1171
B	BLM	Yamhill	OR	81	300	3	PSME	37	100	PSME	17	31	35	L	1163
B	Champion Paper Co.	Pierce	WA	24	300	2	PSME	272	55	TSHE	49	24	44	L	1157
B	U.S. Army	Pierce	WA	23	110	2	PSME	17	90	ALRU	7	18	25	L	1126
B	U.S. Army	Thurston	WA	32	105	2	PSME	296	70	PSME	0	6	12	L	1151
B	U.S. Army	Thurston	WA	49	98	2	PSME	383	65	PSME	15	31	49	L	1152
B	Gifford Pinchot NF	Skamania	WA	101	400	1	PSME	321	80		49	0	20	F	1073
B	Gifford Pinchot NF	Skamania	WA	65	900	2	PSME	111	120	ABGR	0	55	49	L	1136
B	Gifford Pinchot NF	Skamania	WA	14	975	2	PSME	17	300	PSME	5	31	25	L	1140
B	Gifford Pinchot NF	Skamania	WA	61	1220	2	ABAM	173	300	ABAM	27	79	74	L	1168
B	Gifford Pinchot NF	Skamania	WA	32	1190	2	PSME	296	75		15	31	35	L	1169
B	Mount Baker-Snoqualmie NF	Whatcom	WA	16	550	2	PSME	49	100	PSME	0	12	25	L	1049
B	Mount Baker-Snoqualmie NF	Whatcom	WA	24	790	2	TSHE	124	180	TSHE	12	37	44	L	1050
B	Mount Baker-Snoqualmie NF	Whatcom	WA	26	640	3	ABAM	49	175	ABAM	7	12	17	L	1056
B	Mount Baker-Snoqualmie NF	Whatcom	WA	5	245	2	TSHE	44	300	TSHE	5	49	136	W	1061
B	Olympic NF	Jefferson	WA	20	850	2	PSME	20	280	TSHE	0	37	25	L	1040
B	Olympic NF	Jefferson	WA	24	760	2	PSME	40	125	TSHE	0	24	25	L	1043
B	Olympic NF	Jefferson	WA	61	550	2	PSME	296	55	TSHE	10	31	37	L	1128
B	Olympic NF	Mason	WA	45	500	2	PSME	247	60	TSHE	20	31	57	L	1129
B	DNR	Skamania	WA	24	420	2	PSME	272	40		20	12	52	L	1172
B	DNR	Skamania	WA	30	425	1	PSME	309	50	ALRU	20	12	62	L	1175
B	DNR	Thurston	WA	32	275	2	PSME	247	55	ALRU	7	0	20	L	1133
B	DNR	Thurston	WA	16	125	2	PSME	111	45	PSME	20	43	10	L	1134
B	Weyerhaeuser	Cowlitz	WA	28	585	1	PSME	284	38		59	12	25	L	1003
C	OR Dept. Forestry	Clatsop	OR	19	220	2	ACMA	30	45	PSME	15	37	72	F	1160
C	OR Dept. Forestry	Clatsop	OR	81	760	2	PSME	222	45	TSHE	20	31	47	L	1162
C	OR Dept. Forestry	Tillamook	OR	45	725	2	PSME	247	42	PSME	15	31	99	F	1159
C	Mount Hood NF	Clackamas	OR	162	500	2	PSME	5	400	PSME	15	18	25	F	1011
C	Siuslaw NF	Benton	OR	20	170	1	ACMA	99	80		30	0	17	L	1080
C	Siuslaw NF	Benton	OR	40	305	1	PSME	494	85		32	31	40	P	1081
C	Siuslaw NF	Benton	OR	49	275	1	ACMA	37	150		5	18	7	F	1085
C	Siuslaw NF	Lincoln	OR	85	380	3	PSME	148	125	PSME	10	18	17	F	1084
C	Siuslaw NF	Lincoln	OR	81	275	3	PSME	10	300	PSME	5	24	10	F	1086
C	Siuslaw NF	Lincoln	OR	40	150	3	PSME	86	150	PSME	17	18	17	F	1087
C	Siuslaw NF	Lincoln	OR	121	38	2	PSME	111	125	TSHE	5	12	20	F	1108
C	Siuslaw NF	Lincoln	OR	43	150	2	ALRU	556	45	TSHE	62	18	27	L	1115
C	Siuslaw NF	Lincoln	OR	81	165	3	PSME	49	95	ALRU	25	31	32	F	1116
C	Willamette NF	Lane	OR	73	350	2	PSME	40	450	PSME	5	18	30	L	1094
C	Willamette NF	Lane	OR	30	640	2	PSME	25	450	TSHE	10	37	17	F	1100
C	BLM	Multnomah	OR	182	153	2	ACMA	86	75	PSME	5	43	20	F	1150
C	Private	Thurston	WA	85	140	3	PSME	49	60	PSME	7	18	12	L	1121

Table 4—Summary data for stands identified as suitable during 1990 and 1991 for retrospective studies in western Oregon and Washington (continued)

Stand type	Ownership	County	State	Area	Elev.	Canopy layers	Overstory			Lower canopy	Snag dens.		CWD	Stand hist.[b]	Stand no.
							Spp.[a]	No./ha	Age		Soft	Hard			
				Ha	*m*				*Yr*		*No./hectare*				
C	U.S. Army	Pierce	WA	121	87	1	PSME	865	75		10	18	27	L	1124
C	Gifford Pinchot NF	Lewis	WA	22	365	1	ACMA	161	75		20	0	25	L	1088
C	Gifford Pinchot NF	Skamania	WA	16	335	2	THPL	12	500	ACMA	7	6	30	S	1023
C	Gifford Pinchot NF	Skamania	WA	486	520	2	PSME	49	450	PSME	15	24	40	F	1027
C	Gifford Pinchot NF	Skamania	WA	24	550	1	PSME	679	16		40	0	5	L	1071
C	Gifford Pinchot NF	Yakima	WA	24	1035	2	ABGR	222	150	ABGR	7	73	69	L	1139
C	Mount Baker-Snoqualmie NF	Snohomish	WA	61	1060	3	TSHE	371	200	TSHE	10	24	44	F	1001
C	Mount Baker-Snoqualmie NF	Snohomish	WA	32	305	1	PSME	494	60		0	0	44	L	1064
C	Olympic NF	Grays Harbor	WA	12	80	2	ACMA	185	80	PISI	0	31	30	F	1070
C	Olympic NF	Jefferson	WA	49	320	1	ALRU	618	35		111	0	99	L	1075
C	Olympic NF	Jefferson	WA	24	250	1	ALRU	556	40		74	0	91	L	1077
C	Olympic NF	Jefferson	WA	34	98	2	ALRU	296	75	TSHE	44	18	72	L	1119
C	Olympic NF	Jefferson	WA	65	840	2	CHNO	62	999	ABAM	17	31	30	F	1130
C	Olympic NP	Grays Harbor	WA	30	75	2	ALRU	185	100	TSHE	12	24	15	F	1074
C	DNR	Clark	WA	77	500	2	PSME	5	120	PSME	0	31	54	F	1177
C	DNR	Pacific	WA	243	50	1	PSME	494	80		35	31	37	L	1057
C	Weyerhaeuser	Pierce	WA	32	910	1	TSHE	618	80		111	0	94	L	1060
D	Gifford Pinchot NF	Skamania	WA	81	730	2	PSME	49	200	ABAM	20	24	40	F	1022
D	Olympic NF	Jefferson	WA	4	23	1	ABAM	618	80		64	31	119	W	1067
D	Olympic NF	Jefferson	WA	36	670	3	THPL	111	600	TSHE	30	37	40	F	1076
E	Mount Hood NF	Clackamas	OR	121	1310	3	ABAM	173	300	ABAM	5	12	27	L	1013
E	Mount Hood NF	Clackamas	OR	24	1265	2	PSME	2	300	ABAM	5	24	17	L	1014
E	Gifford Pinchot NF	Skamania	WA	32	550	2	PSME	30	450	ABAM	49	31	62	F	1072
F	Gifford Pinchot NF	Skamania	WA	32	945	2	TSHE	5	200	PSME	5	18	40	L	1131
F	DNR	Pacific	WA	32	50	1	PISI	5	300	TSHE	35	0	94	W	1058

[a] Species code, scientific and common names.

CODE, Scientific name, Common name
ABAM, *Abies amabilis*, Pacific silver fir
ABGR, *Abies grandis*, Grand fir
ACMA, *Acer macrophyllum*, Bigleaf maple
ALRU, *Alnus rubra*, Red alder
CHNO, *Chamaecyparis nootkatensis*, Yellow cedar
PIPO, *Pinus ponderosa*, Ponderosa pine
PISI, *Picea sitchensis*, Sitka spruce
PSME, *Pseudotsuga menziesii*, Douglas-fir
RUSP, *Rubus spectabilis*, Salmonberry
THPL, *Thuja plicata*, Western redcedar
TSHE, *Tsuga heterophylla*, Western hemlock
TSME, *Tsuga mertensiana*, Mountain hemlock

[b] Stand history codes : F=fire; W=wind; P=pests or pathogens; L=logging; M=mudflows.

Appendix 3

Example of stand data available on diskette as dBase text report for all stands.

State	County	Township	Range	Section
WA	SKAMANIA	4N	6E	NE 1/4 OF 24
Ownership (Agency or industry name)		Ranger District		
Gifford Pinchot NF		WIND RIVER		
Stand number		TRI compartment		**TRI cell**
1071		8102		282
Photo number		Photo date		Photo scale
L11 385-194		7		12000
Nearest town		Nearest town (miles)		**Map name**
CARSON		14		WIND RIVER FIREMAN
Stand type designation		Size of stand (acres)		**Shape**
ShapeC		60		SQUARE
Slope (% angle)		Stand aspect (Azimuth)		**Elevation (m)**
10		40		550
Topographic position		Soil origin		**Stand moisture condition**
L		MESIC		DRY

Neighborhood and Landscape Context

A Measure of the Forest Age Class Conditions Surrounding the Surveyed Stand

From a Neighborhood and Landscape View — Percent of the Land in a Specific Condition

STAND-clearcut	0	STAND-Mature, large timber	0
LANDSCAPE-clearcut	20	LANDSCAPE-Mature, large timber	0
STAND-clearcut (saplings/poles)	0	STAND-Old-growth	99
LANDSCAPE-clearcut (saplings/poles)	0	LANDSCAPE-Old-growth	50
STAND-Young, small timber	0	STAND-Meadow, subalpine openings	0
LANDSCAPE-Young, small timber	15	LANDSCAPE-Meadow, subalpine openings	0

Vegetation and Structural Composition of the Stand

Canopy Layers (Uneven vs Even-aged structure)	E	Number of Layers	1

Overstory or Dominant Canopy Layer

Dominant overstory species #1	PSME	Density (trees per acre)	275
Dominant overstory species #2	TSHE	Density (trees per acre)	25
Dominant overstory species #3	ABAM	Density (trees per acre)	20
Dominant overstory species #4	AGBR	Density (trees per acre)	5
Estimated age of overstory dominants	16		
Height of dominant trees (meters)	6	Mean DBH of dominants (cm)	12

Secondary or Intermediate Canopy Layer

Subdominant Tree species #1		Density (trees per acre)	0
Subdominant Tree species #2		Density (trees per acre)	0

Subdominant Tree species #3		Density (trees per acre)	0
Mean height of subdominants (meters)	0.0	Mean DBH of Subdoms (cm)	0

Description of stand

Stand was PCT in 1980 hardwood were left with conifer crop trees. Stand was originally cut 1974. Planted with PSME.

Understory Vegetation — Percent Cover

Species #1	GASH	Species #7	XETE
% Cover #1	15.0	% Cover #7	1.0
Species #2	BENE	Species #8	RUUR
% Cover #2	5.0	% Cover #8	1.0
Species #3	VAPA	Species #9	CHUM
% Cover #3	3.0	% Cover #9	0.5
Species #4	PTAQ	Species #10	
% Cover #4	4.0	% Cover #10	0.0
Species #5	LIBO2	Species #11	
% Cover #5	2.0	% Cover #11	0.0
Species #6	COCA	Species #12	
% Cover #6	1.0	% Cover #12	0.0

Coarse Woody Debris Distribution — by Structure

Small Standing Dead (SNAGS)

Small snags - species #1		Density (snags/acre) sm #1	0
Small snags - species #2		Density (snags/acre) sm #2	0

Large Standing Dead

Density of large, soft snags	**Diameter**	**Height**	**Current vs Residual**
(Snags/acre)	(cm)	(m)	(when snag originated?)
16	85	0.5	R
Density of large, hard snags	Diameter	**Height**	Current vs Residual
(Snags/acre)	(cm)	(m)	(when snag originated?)
0	0	0.0	N/D

Down Dead - Fallen trees (logs) on the forest floor)

Mean total of Coarse Woody Debris (CWD) pieces/acre
2

Number of soft pieces	Current vs Residual
2	R
Number of hard pieces	Current vs Residual
0	N/D

Mean diameter of CWD (cm)
60

Stand History

Stand disturbance - Fire, Wind, Pests/Pathogens, Logged, Mudflow	L
If stand was managed (silvicultural system used?)	TRACTOR
Regeneration method (naturals vs planted)	P
Site preparation activities - Leave tree spacing (trees/acre)	10
Retrospective study survey date	02/21/91
Observer	T.Thomas
Ranger district contact	JOHN FORSBERG
Dist Telephone #	509-427-5645

Directions to stand

From WR Ranger Station.
Take 1st right onto 43 road, follow past large nursery beds and beyond TT Munger RNA, turn left at junction staying on 43. Stay on 43 at junction with 4306, cross bridge over Trout Creek and turn left (road 4309) towards Planting Creek Studies (follow sign). Drive 0.6 mile to red flagging on right (distance from turn onto 4309).

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Thomas, Ted B.; Lehmkuhl, John F.; Raphael, Martin G.; DeBell, Dean S. 1993. Sites for retrospective studies: opportunities for research in western Washington and Oregon. Gen. Tech. Rep. PNW-GTR-312. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 24 p.

Sites were identified on publicly managed and privately owned lands in western Oregon and Washington where research or demonstration of new forestry practices could be conducted by using a retrospective approach. One hundred and seventy-six stands were selected for this catalog to represent examples of the future condition that could be expected from new forestry practices. Information from these stands will serve to guide current management in developing alternative forestry practices. The stand types cataloged are characteristic of a range of structural conditions desirable for specific objectives that could be achieved with alternative forestry practices. Baseline information on overstory and understory composition and structure, amounts of coarse woody debris, disturbance history, past management activities, and landscape context of each stand was compiled in a database and is available to the forest research and management community. Information will aid researchers from many disciplines and managers by providing data about stand conditions and locations.

Keywords: New forestry, new perspectives, ecosystem management, retrospective studies, database, stand conditions.

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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