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Forest Resources of the Nez Perce National Forest

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About the author

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As part of a National Forest System cooperative inventory, the Interior West Forest Inventory and Analysis (IWFIA) Program of the USDA Forest Service conducted a forest resource inventory on the Nez Perce National Forest using a nationally standardized mapped-plot design (for more details see the section "Inventory methods"). This report presents highlights of the inventory using commonly requested variables and summaries. The data could be summarized in other ways for different purposes (see "For further information" on the inside back cover). The information presented in this report is based on the IWFIA inventory sample collected in 2001 (USDA 2001). Supplementary documentation and inventory terminology can be located in USDA 2002b. Additional data collected by the Nez Perce National Forest and used separately or in combination with IWFIA data may produce varying results. Changes since the inventory, such as the impact of recent disturbances on the forest, have not been incorporated into this report. Annual inventories will soon replace periodic inventories to help monitor these changes at shorter intervals.

Description of the Nez Perce National Forest

The Nez Perce National Forest administers 2,111,238 acres (USDA 2000, 2002a) of which 94 percent is forest land, and 6 percent is nonforest or water (fig. 1). This report describes characteristics of forest land sampled on the Nez Perce. Forest land is land that is at least 10 percent stocked (or formerly stocked) with live tally tree species and is greater than 1 acre in size and 120 feet wide. Forest land is subdivided into timberland, where most trees are timber species commonly used for industrial wood products (such as Douglas-fir and lodgepole pine), and woodland, where most trees have a multi-stem growth form and are not typically used for industrial wood products (such as Rocky Mountain maple). Forty percent of the area administered by the Nez Perce National Forest is in reserved designation in the Selway-Bitterroot, Gospel-Hump, and Frank Church-River of No Return Wilderness areas. In addition, sixty thousand acres of Hell's Canyon Wilderness lie within Nez Perce National Forest, but are administered by the Wallowa-Whitman National Forest. The first part of this report focuses on resources of all forest land administered by the Nez Perce National Forest. A subsequent section will address nonreserved timberland.

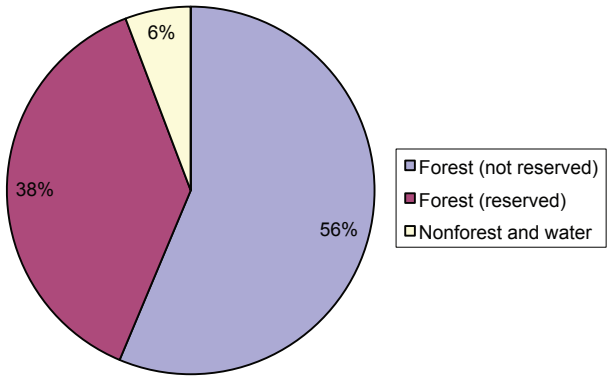

Figure 1—Percent area by land class and reserved status, Nez Perce National Forest, 2001.

Forest land highlights of the Nez Perce National Forest

Forest type—Forest resources are often described using a forest type classification. Forest type refers to the predominant tree species in a stand, based on plurality of tree stocking. Stocking is an expression of the extent to which growing space is effectively utilized by live trees.

Forest types are dynamic and can change slowly through forest succession, or rapidly due to disturbances such as logging, fire, or insect and disease epidemics. Figure 2 presents the distribution of forest land area on the Nez Perce National Forest by forest type. The spruce-fir forest type is the most common at 24 percent, followed in abundance by grand fir and Douglas-fir, each at 22 percent, and lodgepole pine at 15 percent. The ponderosa pine forest type comprises 9 percent of the forest land area; western redcedar, 4 percent; and maple woodland and Engelmann spruce each 2 percent. All western larch and *Cercocarpus* woodland sampled was nonstocked.

Tree and stand size—The size distribution of trees is an indicator of structural diversity. Figure 3 displays the distribution of the 852 million live trees on the Nez Perce National Forest by diameter class. Overall, this shows a typical diameter distribution with higher numbers of smaller trees. Trees often reproduce prolifically, but thin out naturally over time due to competition for resources.

Stand-size class is a classification of forest land based on the dominant diameter class of live trees that contribute to stand stocking. When describing stand size, large trees are timber-type softwoods and all woodland tree species 9.0 inches diameter and greater, and timber-type hardwoods 11.0 inches diameter and greater; medium trees include timber-type softwoods and all woodland tree species 5.0 to 8.9 inches diameter, and timber-type hardwoods 5.0 to 10.9 inches diameter; and saplings/seedlings are trees under 5 inches diameter. Nonstocked stands are typically those that have been recently disturbed by tree cutting, forest fire, or other large-scale change. For tree stocking, fewer large-diameter trees compared to small-diameter trees are required to fully stock a site. Figure 4 shows a breakdown of forest land on the Nez Perce National Forest by stand-size class. Seventy-four percent of forest has a majority of stocking from large trees, while 3 percent are nonstocked.

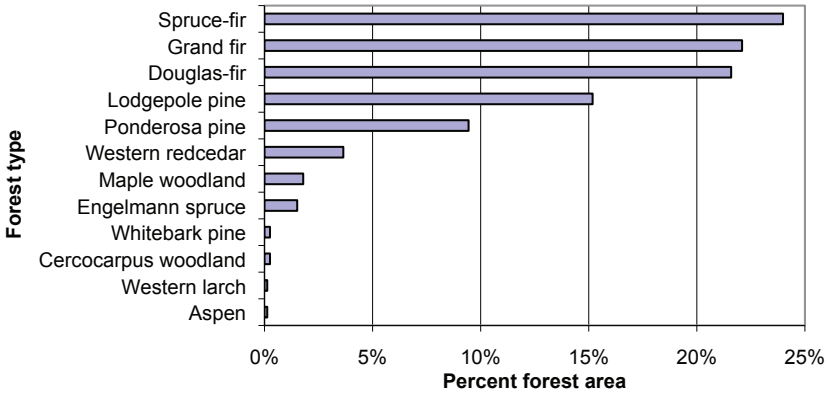

Figure 2—Percent of forest land area by forest type, Nez Perce National Forest, 2001.

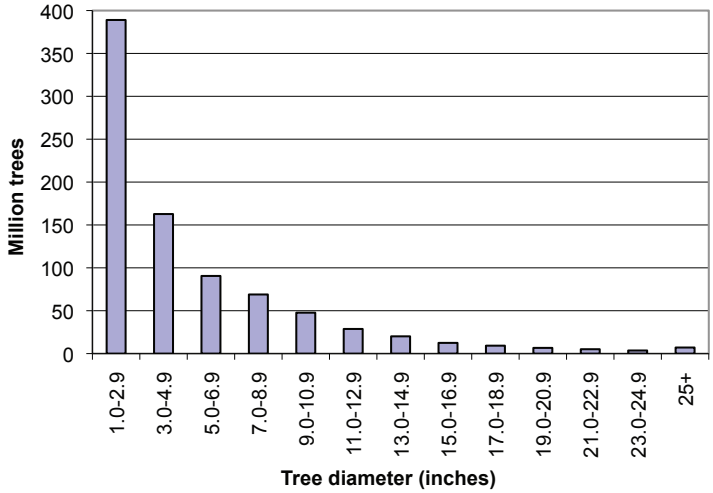

Figure 3—Number of live trees on forest land by diameter class, Nez Perce National Forest, 2001.

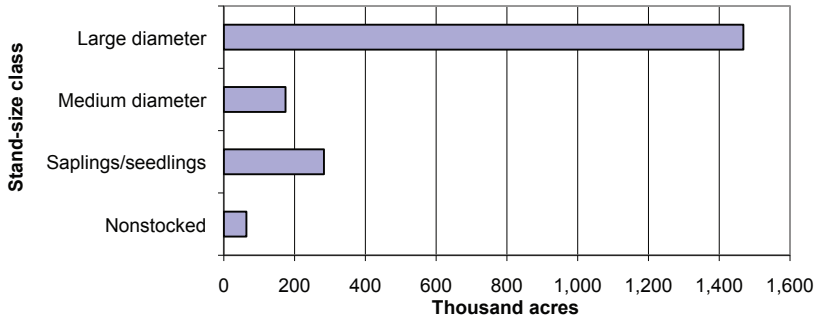

Figure 4—Forest land area by stand-size class, Nez Perce National Forest, 2001.

Figure 5 shows the area of forest land by forest type and stand-size class on the Nez Perce National Forest. The three most common forest types in the large class are grand fir, spruce-fir, and Douglas-fir. Together they comprise 70 percent of the large tree stands and 68 percent of all forest land. Lodgepole pine is the most abundant forest type for medium diameter stands, accounting for 44 percent of such stands and 15 percent of all forest land. The whitebark pine, aspen, and western larch forest types collectively represent 0.5 percent of forest land on the Nez Perce, and are pooled in figure 5.

Number of live trees—Another way to assess forest diversity is by examining the composition of forest land by tree diameter and species. Figure 6 shows the 852 million live trees by species in three diameter classes. Sixty-five percent of all live trees are from 1.0 to 4.9 inches diameter, 19 percent are from 5.0 to 8.9 inches

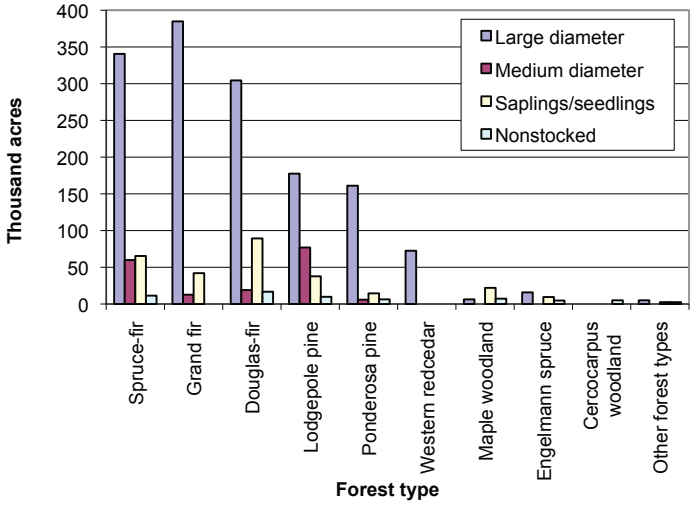

Figure 5—Forest land area by stand-size class and forest type, Nez Perce National Forest, 2001.

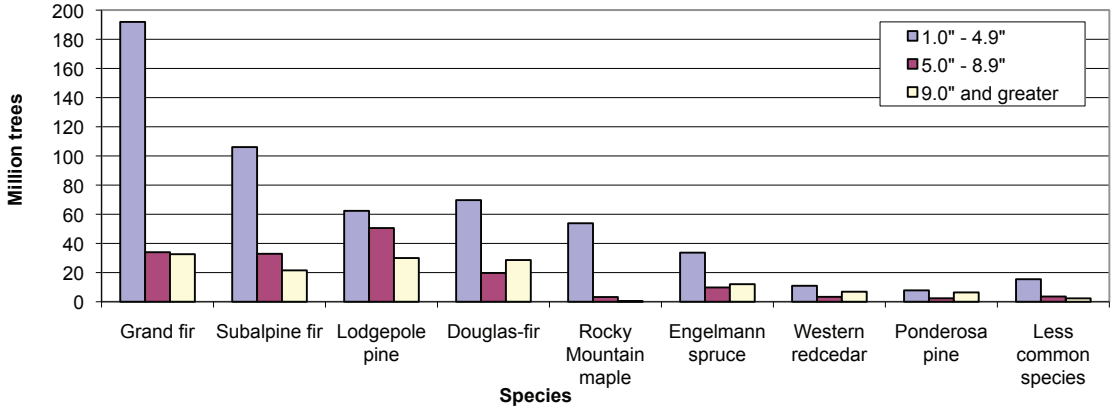

Figure 6—Number of live trees 1.0 inch in diameter and greater on forest land by species and diameter class, Nez Perce National Forest, 2001.

diameter, and 17 percent are 9.0 inches diameter and greater. Grand fir makes up 30 percent of the total number of trees; subalpine fir, 19 percent; lodgepole pine, 17 percent; Douglas-fir, 14 percent; Rocky Mountain maple, 7 percent; Engelmann spruce, 7 percent; and western redcedar and ponderosa pine, each 2 percent. Species pooled in figure 6 are Pacific yew, whitebark pine, western larch, paper birch, western white pine, and aspen (3 percent collectively). There are an estimated 5.1 million live whitebark pines on the Nez Perce, 62 percent of which are saplings. There are an estimated 82,000 live western white pines, all of which are between 5.0 and 8.9 inches diameter.

Figure 7 shows the number of live trees 5.0 inches diameter and greater by species and elevation class.

Elevation is closely correlated with variations in local climate. Precipitation generally increases with rising elevation, while temperature decreases. Aspect complicates this general rule; allowing relatively warmer- and dryer-site species to grow at higher elevations on south- and west-facing slopes. These factors have a profound effect on competition between tree species. The Nez Perce National Forest displays some distinct elevation patterns in tree distribution: subalpine fir and lodgepole pine do well at higher elevations, and grand fir is most common in the middle elevations. Douglas-fir can be found in a range of elevations. Paper birch, Pacific yew, western white pine, and aspen each represent 0.25 percent or less of live trees 5.0 inches diameter and greater on the Nez Perce National Forest and are pooled in figure 7.

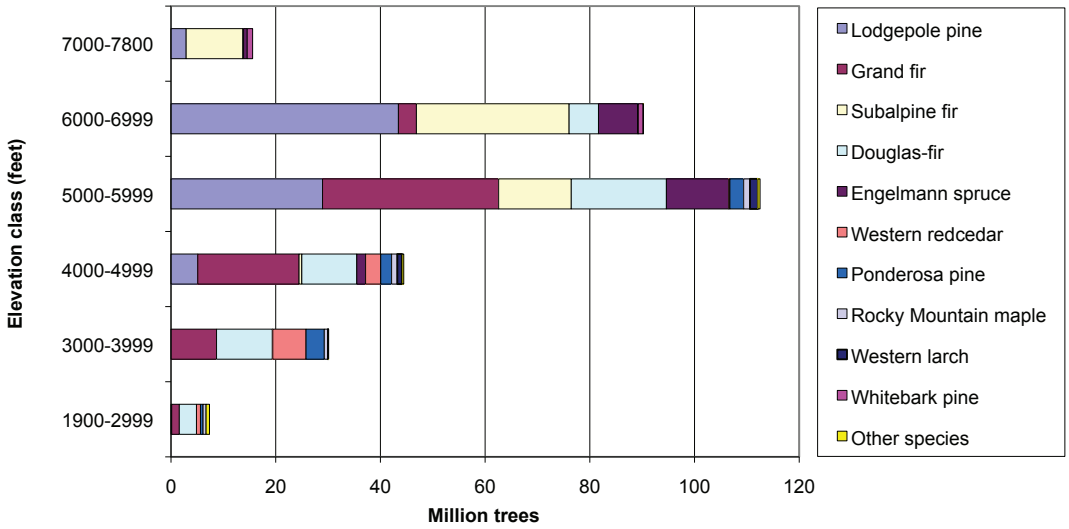

Figure 7—Number of live trees 5.0 inches diameter and greater on forest land by species and elevation class, Nez Perce National Forest, 2001.

Number and weight of dead trees—Standing and down dead trees are important for wildlife and in fire ecology, as well as acting as nutrient sinks and erosion controls. Approximately 67 million standing dead trees (snags) and 58 million down dead trees 5.0 inches diameter and greater are on forest land on the Nez Perce National Forest. If trees 1.0 inch diameter and greater are included, there are 176 million snags and 156 million down dead trees.

Many animals are dependent upon snags, but the species, size, and density of snags required for quality habitat vary by wildlife species. Large diameter dead trees are generally scarce relative to smaller trees. An estimated average of 9.9 snags 11.0 inches diameter or larger occur per acre of forest land. Of the very large snags (19.0 inches diameter or larger) there are an estimated 2.3 per acre. Nineteen-inch and larger snags were most commonly grand fir (34 percent), followed by Douglas-fir (29 percent).

Dead trees are an important component of forest fuel loads. On the Nez Perce, about 19.7 million tons of standing dead trees and 13.9 million tons of down dead trees are on forest land. This estimate includes the merchantable bole and bark of trees 5.0 inches diameter and greater. Figure 8 shows the weight per acre of down dead trees by stand-size class and forest type. For all forest types combined, the large tree class has the highest weight at 7.6 tons per acre, followed by the medium tree class at 6.7 tons per acre, and the sapling/seedling class at 5.0 tons per acre. For all stand-size classes combined, the spruce-fir type has the highest weight at 11.4 tons per acre, followed by grand fir and western redcedar at 8.1 and 6.5 tons per acre. No down dead trees were sampled for aspen, mountain mahogany, and western larch. Several of the class breakdowns displayed in figure 8 may not be representative due to small sample sizes.

Stand age—Stand age is estimated from core samples of live trees. The estimate is limited to trees with diameters in a stand's designated stand-size class. Many factors affect the number of sample trees available for determining stand age. In general, stand age for dense stands that contain more core sample trees is more representative than stand age for sparse stands that contain fewer.

Figure 9 breaks out forest land area by forest type and stand-age class on the Nez Perce National Forest. Stand age can indicate the duration since the last extensive disturbance of the forest overstory. This figure shows the 81- to 100-year class as the most common on the Forest, followed by the 101- to 120-year and 61- to 80-year age classes.

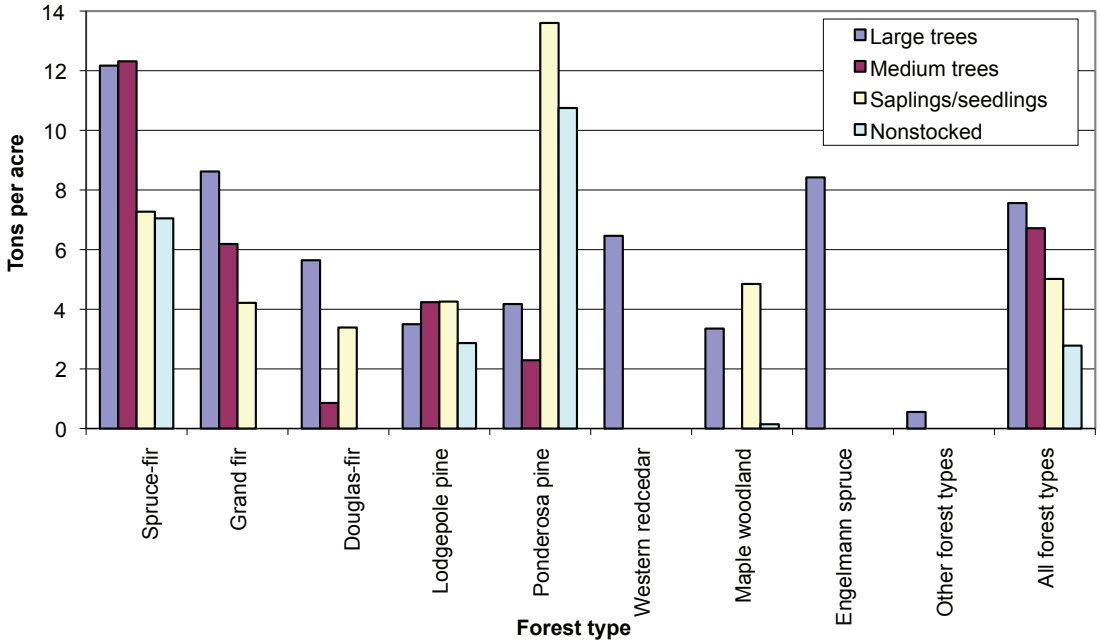

Figure 8—Weight of down dead trees 5.0 inches diameter and greater on forest land by forest type and stand-size class, Nez Perce National Forest, 2001.

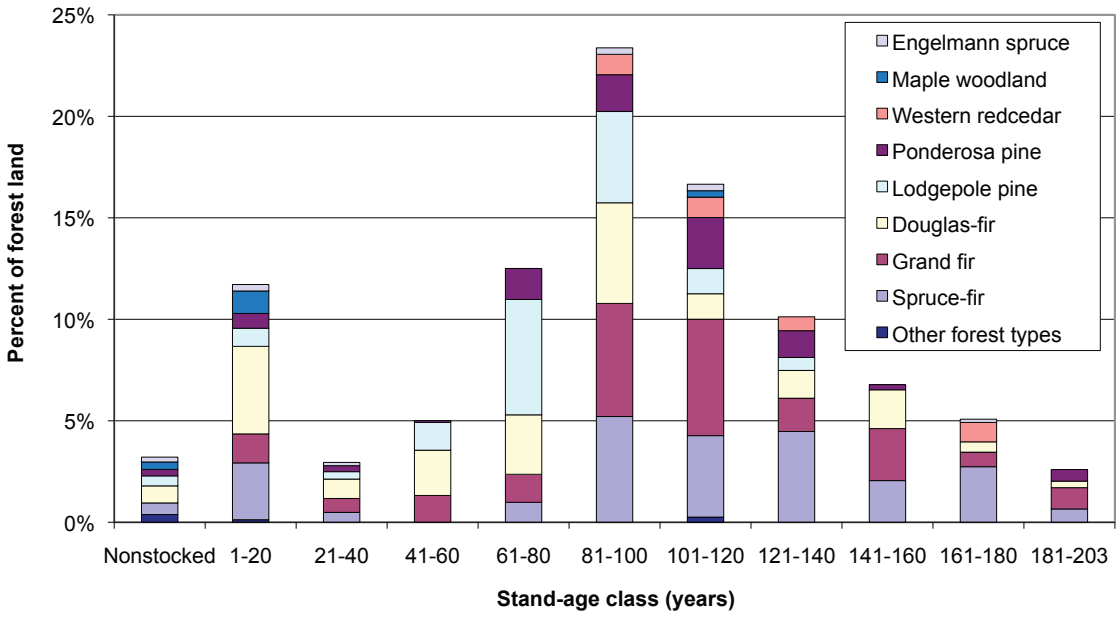

Figure 9—Percent of forest land area by forest type and stand-age class, Nez Perce National Forest, 2001.

Wood volume, biomass, and basal area of live trees—Estimates of cubic-foot volume and basal area include all live trees 5.0 inches diameter and greater. Basal area is the cross-sectional area of a tree stem/bole (includes bark) at the point of diameter measurement. Biomass estimates include boles, bark, and branches of all live trees 1.0 inch diameter and greater. The net volume of wood on the Nez Perce National Forest is estimated to be 6.8 billion cubic feet. Total biomass of wood is estimated at nearly 115 million tons, and the total basal area is estimated to be about 220 million square feet. Table 1 is a breakdown of volume, biomass, and basal area by species.

Table 1—Net volume, biomass, and basal area on forest land by species, Nez Perce National Forest, 2001.

Species	Volume (≥5.0″ dia.) (Million cubic feet)	Biomass (≥1.0″ dia.) (Million tons)	Basal area (≥5.0″ dia.) (Million square feet)
Aspen	0.1	*	*
Douglas-fir	1,247.3	24.5	43.8
Engelmann spruce	643.4	9.5	19.1
Grand fir	1,924.1	32.1	57.5
Lodgepole pine	1,026.5	16.9	34.9
Pacific yew	0.5	0.1	0.2
Paper birch	4.7	0.1	0.2
Ponderosa pine	615.7	11.3	16.2
Rocky Mountain maple	15.1	0.6	1.0
Subalpine fir	664.9	11.1	27.3
Western larch	106.3	2.1	3.3
Western redcedar	490.5	6.6	15.6
Western white pine	0.2	*	*
Whitebark pine	17.1	0.3	0.8
Total (not exact due to rounding)	**6,756.6**	**115.0**	**220.0**

* – Less than 15,000

Figure 10 displays the percent net cubic-foot volume of live trees by diameter class. Eighty-seven percent of this volume is 9.0 inches diameter and greater. Ninety-three percent each of grand fir and Douglas-fir volume, and 92 percent of Engelmann spruce volume are in trees 9.0 inches diameter and larger. Common species with low percentages of volume in trees 9.0 inches diameter and larger include lodgepole pine at 64 percent and subalpine fir at 74 percent. Ponderosa pine, western redcedar, and western larch are all over 96 percent in trees over 9.0 inches diameter, but together these species represent 18 percent of volume.

Another way to look at wood volume is by forest type, for which per-acre estimates can be computed along with basal area (table 2). These numbers include the many different species that can occur together in each forest type. The highest volume and basal area per acre on the Nez Perce National Forest is in the western redcedar forest type. Volume and basal area per acre for whitebark pine, aspen, *Cercocarpus* woodland, and western larch may not be representative due to small sample size.

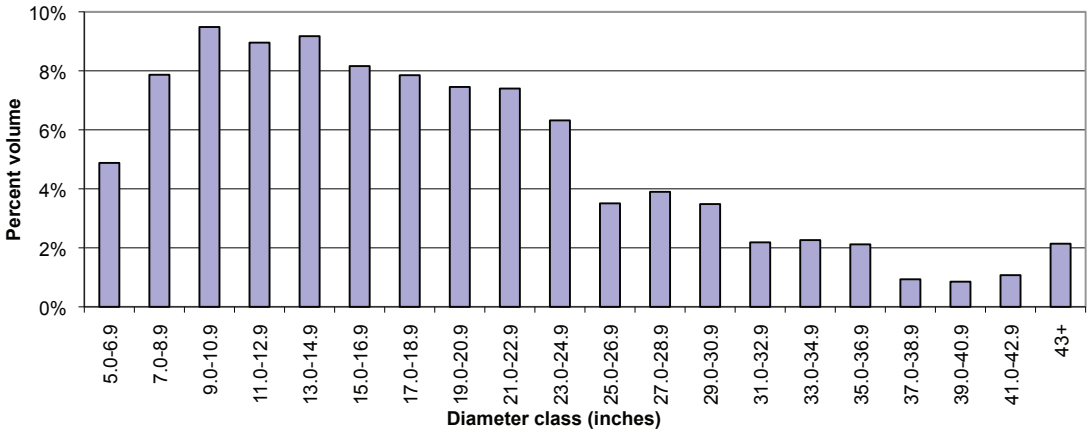

Figure 10—Percent of total net cubic-foot volume of live trees by diameter class, Nez Perce National Forest, 2001.

Table 2—Net volume per acre, basal area per acre, number of conditions, and condition proportions on forest land by forest type, Nez Perce National Forest, 2001.

Forest type	Net cubic-foot volume per acre	Basal area sq. ft. per acre	Number of conditions[a]	Condition proportions[a]
Western redcedar	7,758	226	11	11.0
Grand fir	4,703	142	71	67.1
Ponderosa pine	3,271	93	33	30.0
Lodgepole pine	2,939	105	49	45.7
Douglas-fir	2,824	96	70	63.8
Spruce-fir	2,754	99	75	71.2
Engelmann spruce	2,247	79	6	4.8
Maple woodland	765	27	6	5.3
Whitebark pine	628	35	1	1.0
Aspen	39	3	1	0.0
Cercocarpus woodland	0	0	1	1.0
Western larch	0	0	1	0.5
All forest types	**3,396**	**111**	**325**	**301.7**

[a]One characteristic of the mapped-plot design is that plot area may be split between multiple conditions. When plots are split, the proportion of a plot represented by each condition is calculated. Condition proportions across a landscape can be added to indicate the amount of area sampled for different forest types (or any other condition attribute). Table 2 shows the number of conditions (usually the number of different plots containing that forest type) and condition proportions (area sampled as a multiple of the area of an FIA plot).

Stand density index—Many factors influence the rate at which trees grow and thrive, or die. As tree size and density increase, competition for available resources also increases. Stand density index (SDI), as developed by Reineke (1933), quantifies the relationship between trees per acre and average stand diameter. The concept was developed for even-aged stands dominated by one or two related size classes (based on diameter and/or height), but can also be applied to uneven-aged stands composed of three or more size classes (Long and Daniel 1990; Shaw 2000). SDI is usually presented as a percentage of the maximum SDI for each forest type (Van Dyck 2002). Maximum SDI values for the forest types on the Nez Perce National Forest were estimated using FIA plot data, and formulated specifically to match the procedure used by FIA to calculate SDI (Shaw 2000). Resulting percentages were grouped into four classes (fig. 11), whose thresholds have ecological and management significance. A site is considered to be fully occupied at 35 percent of SDI maximum, which marks the onset of competition-related stresses and slowed growth rates (Long 1985). An estimated 60 percent of forest stands on the Nez Perce National Forest are considered to be fully occupied.

Components of change: growth—Another measure of forest vigor is net annual growth. Net annual growth is the difference between gross annual growth and losses due to mortality. Gross annual growth of live trees (5.0 inches diameter and greater) on forest land on the Nez Perce National Forest is estimated to be 144 million cubic feet, and net annual growth is 102 million cubic feet. Gross annual growth is compared to mortality for seven high volume species in figure 12. Mortality on forest land on the Nez Perce National Forest is about 29 percent of gross annual growth.

Components of change: mortality—Field crews assess which trees have died in the past 5 years; these trees are used to estimate an average annual mortality. Based on this estimate, 41.6 million cubic feet of wood is from trees (5.0 inches diameter and greater) that died on the Nez Perce National Forest in 2000. About 22 percent of the mortality was caused by root disease, 20 percent by fire, and 12 percent by mountain pine beetles. The following five species account for 98 percent of overall mortality: Douglas-fir (26 percent), lodgepole pine (23 percent), grand fir (22 percent), subalpine fir (19 percent), and

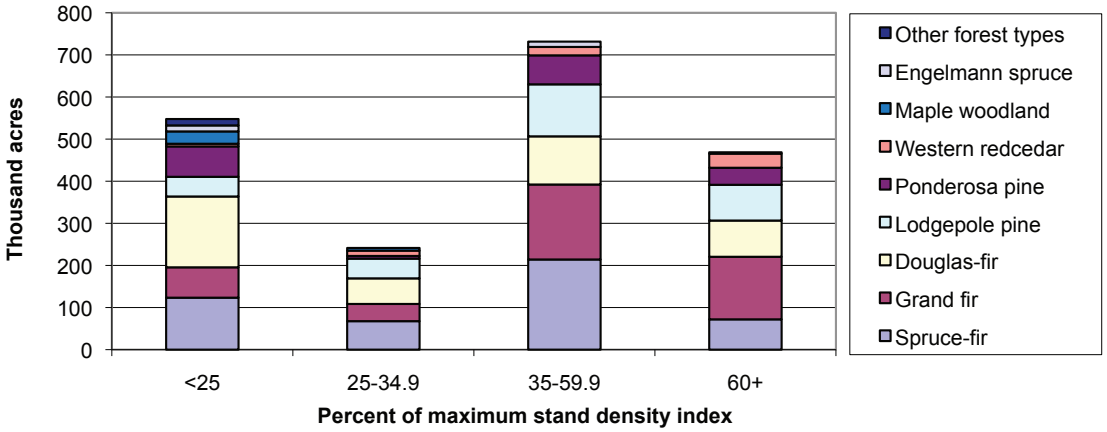

Figure 11—Area of forest land by forest type and stand density index, Nez Perce National Forest, 2001.

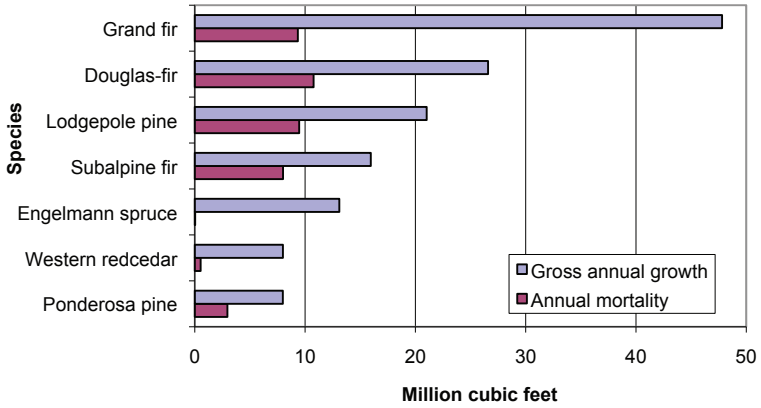

Figure 12—Gross annual growth and mortality of live trees 5.0 inches diameter and greater for seven high volume species on forest land, Nez Perce National Forest, 2000.

ponderosa pine (7 percent). Whitebark pine mortality is estimated to be 451 thousand cubic feet or 63 percent of whitebark pine gross annual growth. No western white pine mortality was recorded during the inventory.

Understory vegetation—Understory vegetation provides forage and cover for wildlife, contributes to forest fuel load, and can be an indication of the successional stage of the forest community. Figure 13 shows the average percent cover of four plant groups on forest land by forest type. Grand fir is the most abundant understory seedling/sapling species, followed by subalpine fir and Rocky Mountain maple. The most abundant understory shrubs are huckleberry, fool's huckleberry, and grouse whortleberry. Beargrass, Idaho goldthread, and heartleaf arnica are the most abundant forbs; and pinegrass and elk sedge are the most abundant understory graminoids on the forest.

Nonreserved timberland highlights of the Nez Perce National Forest

Reserved lands are those that have been withdrawn from management for production of wood products, such as wilderness areas and national parks. Sixty percent of forest land on the Nez Perce is nonreserved, of which 99 percent is designated as timberland. There are 494 million live growing-stock trees on nonreserved timberland.

Forest type—Grand fir is the most common forest type on nonreserved timberland on the Nez Perce at 29 percent, followed by Douglas-fir (21 percent) and lodgepole pine (17 percent). Spruce-fir, the most common forest type on all forest land, is 16 percent of nonreserved timberland.

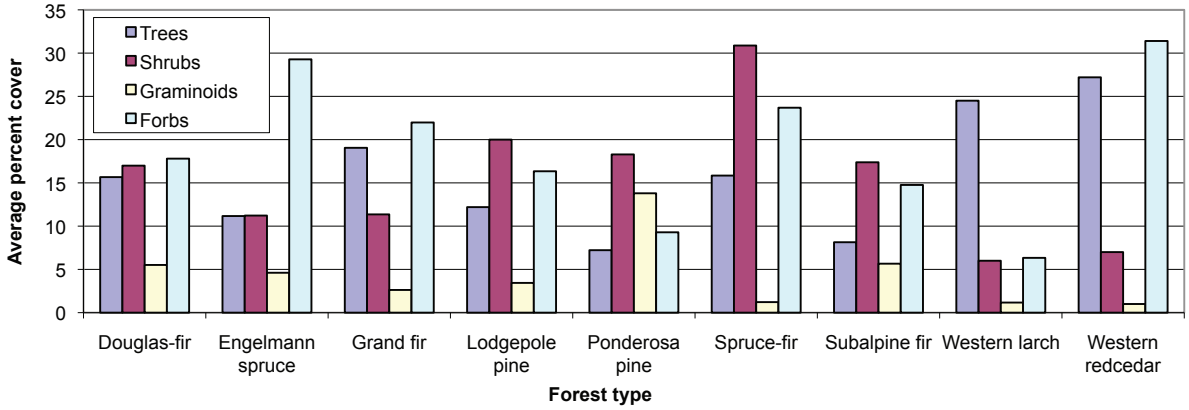

Figure 13—Average percent cover of trees (seedlings/saplings), shrubs, forbs, and graminoids on forest land by forest type, Nez Perce National Forest, 2001.

Dead trees and fuels—There are approximately 45 million standing dead trees (snags) and 38 million down dead trees 5.0 inches diameter and greater on nonreserved timberland. Snags at least 11.0 inches diameter are found at densities of 10.1 per acre, and there are 2.5 snags per acre that are 19.0 inches diameter or greater. The merchantable bole and bark of dead trees at least 5.0 inches in diameter on reserved timberland is about 6.2 million tons in standing dead trees, and 5.4 million tons in down dead trees.

Weight of dead and down trees per acre is about 1.4 percent greater on nonreserved timberland than on all forest land. For large stand sizes, this difference is nearly 4 percent (7.9 tons per acre versus 7.6 tons per acre for all forest land). For most forest types, weight per acre of dead and down trees is greater on nonreserved timberland than on all forest land. Forest types with the largest differences are western redcedar (32 percent more), lodgepole pine (11 percent more), grand fir (8 percent more), and ponderosa pine (8 percent less).

Stand age—The distribution of stand ages on nonreserved timberland is similar to that of all forest land with the exception of a smaller proportion of stands with ages from 1 to 21 years. As with all forest land, the 81- to 100-year age class is the most common, followed by the 101- to 120-year and 61- to 80-year age classes.

Wood volume, biomass, and basal area of growing-stock trees—Table 3 displays a breakdown of net volume, tons of wood biomass, and square foot basal area for growing-stock trees 5 inches diameter and greater by species on nonreserved timberland. Estimated total net volume is 4.4 billion cubic feet. Grand fir had the most net volume (32 percent), followed by Douglas-fir (18 percent) and lodgepole pine (16 percent). Total wood biomass is estimated at 72 million tons. Grand fir had the most wood biomass (31 percent), followed by Douglas-fir (21 percent) and lodgepole pine (16 percent). Total basal area is estimated at 141 million square feet, 30 percent in grand fir, 20 percent in Douglas-fir, and 17 percent in lodgepole pine.

Sawtimber volume on nonreserved timberland is estimated to be nearly 23 billion board feet (International ¼-inch rule). This includes all growing-stock trees 9.0 inches diameter and greater for softwoods, and 11.0 inches diameter and greater for hardwoods. Figure 14 illustrates the sawtimber volume on nonreserved timberland by diameter. The 11.0- to 12.9-inch diameter class has the most volume at 9.8 percent, followed by the 9.0- to 10.9-inch class at 9.6 percent and the 21.0- to 22.9-inch class at 9.3 percent. Thirty-four percent of the total sawtimber volume on the Nez Perce National Forest is from grand fir, 19 percent from Douglas-fir, 12 percent from ponderosa pine, and 11 percent from lodgepole pine.

Stand density index—Seventy percent of the nonreserved timberland stands on the Nez Perce National Forest are at 35 percent or more of SDI maximum, or considered to be fully occupied. Eighty-one percent of grand fir stands, 79 percent of lodgepole pine stands, and 50 percent of Douglas-fir stands are fully occupied.

Table 3—Net volume, biomass, and basal area of growing-stock trees 5 inches diameter and greater by species on nonreserved timberland, Nez Perce National Forest, 2001.

Species	Volume (Million cubic feet)	Biomass (Million tons)	Basal area (Million square feet)
Douglas-fir	813.1	15.4	27.7
Engelmann spruce	342.8	4.8	10.2
Grand fir	1,407.5	22.2	42.6
Lodgepole pine	722.0	11.2	23.8
Pacific yew	0.3	*	0.1
Paper birch	4.7	0.1	0.2
Ponderosa pine	442.2	8.0	11.3
Subalpine fir	284.5	4.2	11.1
Western larch	104.1	2.0	3.2
Western redcedar	314.0	4.2	10.4
Western white pine	0.1	*	*
Whitebark pine	9.3	0.2	0.4
Total (not exact due to rounding)	**4,444.8**	**72.4**	**141.1**

* – Less than 50,000

Components of change: growth and mortality—Gross annual growth is estimated at 96 million cubic feet, while mortality is an estimated 28 million cubic feet, or 29 percent of gross annual growth. Figure 15 displays the gross annual growth and mortality of growing-stock trees for seven high-volume species on Nez Perce nonreserved timberland. High gross annual growth coincided with relatively low mortality for grand fir. Gross annual growth is estimated at 35.6 million, 17.4 million, 15.0 million, and 7.8 million cubic feet for grand fir, Douglas-fir, lodgepole pine, and Engelmann spruce. Annual mortalities for the same four species are estimated at 4.4 million, 10.0 million, 7.5 million, and 17 thousand cubic feet.

Inventory methods

The Forest Inventory and Analysis (FIA) program samples forest across all ownerships. The resulting data can be used for planning and analysis at local, state, regional, and national levels. IWFIA uses a two-phase sampling procedure for all inventories. Phase one is based on a grid of sample points systematically located every 1,000 meters across all lands in a state. Phase one points are assigned ownership and vegetative cover attributes using maps and remotely sensed imagery.

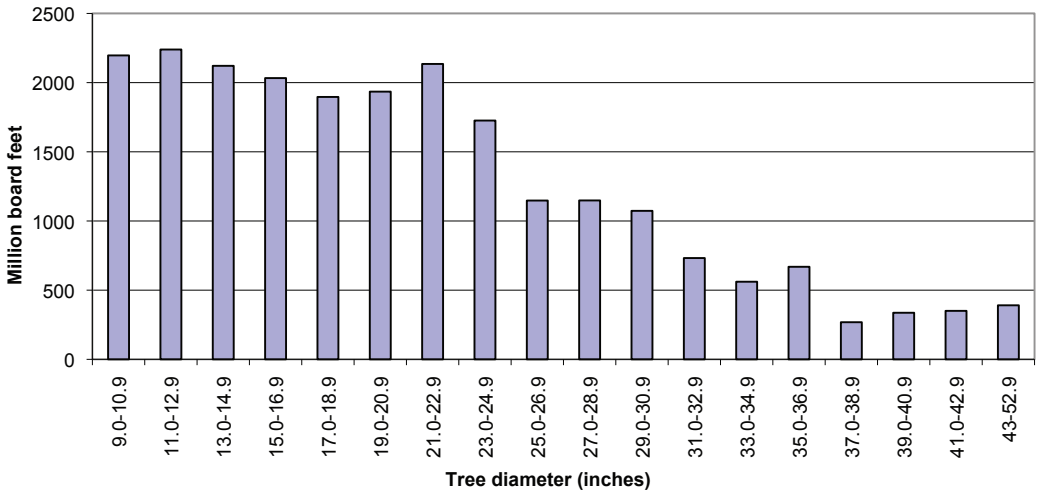

Figure 14—Sawtimber volume (International ¼-inch rule) on nonreserved timberland by diameter class, Nez Perce National Forest, 2001.

Field crews conduct phase two of the inventory on the subsample of phase one points that occur on forest land. The sampling intensity is one field plot every 5,000 meters, or about every 3 miles. Phase two plots are stratified based on phase one ownership and vegetation information, and weights are assigned to each stratum based on the proportion of phase one points in that stratum.

About the mapped-plot design—The mapped-plot design was adopted by FIA nationwide by 1995. Its predetermined subplot layout uses boundary delineation to quantify and distinguish between multiple conditions. Most plots sample one forest condition; therefore, mapping condition boundaries is often unnecessary.

Conditions are delineated based on differences in any of five attributes: forest/nonforest, forest type, stand-size class, stand origin, and stand density. The condition proportion is the fraction of plot area sampled in each condition, with the sum of all condition proportions for an accessible plot equal to 1.00. Therefore, the number and relative size of plot conditions determines the weighted area used for sample expansion. There were 339 field plots on the Nez Perce National Forest, 18 of which were hazardous and/or inaccessible. A total of 291 field plots sampled only forest conditions, 15 sampled both forest and nonforest conditions, 1 sampled both forest and water conditions (rivers, reservoirs, lakes, etc. at least

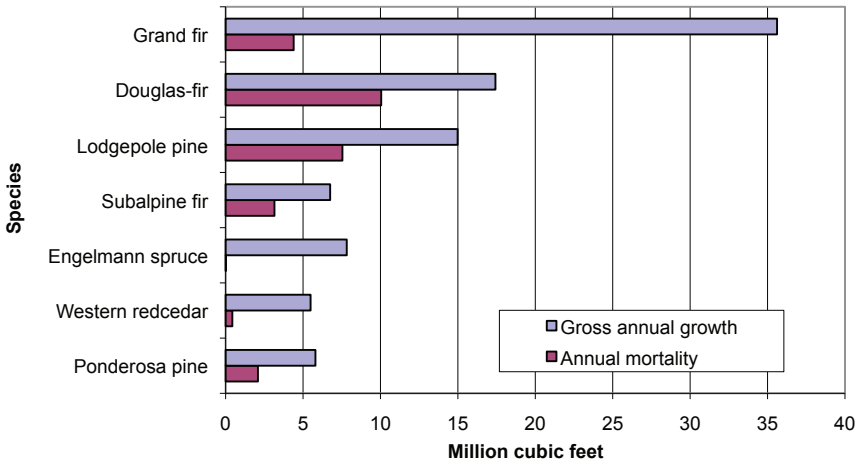

Figure 15—Gross annual growth and mortality of growing-stock trees 5.0 inches diameter and greater for seven high volume species on nonreserved timberland, Nez Perce National Forest, 2000.

30 feet wide or 1 acre in area), 12 sampled only nonforest conditions, 1 sampled both nonforest and water, and 1 sampled forest, nonforest, and water. A total of 325 forest conditions were sampled on 308 plots that contained 301.7 forest, 5.4 nonforest, and 0.8 water condition proportions. No stocked stands were sampled for *Cercocarpus* woodland or western larch forest types.

Standard errors—The sample was designed to meet national standards for precision in state and regional estimates of forest attributes. Standard errors, which denote the precision of an estimate, are usually higher for smaller subsets of the data. Forest-level estimates and percent standard errors by land class or type of trees for various attributes are presented in table 4. Standard errors for other estimates are available upon request (see "For further information" section on the inside back cover).

Table 4—Percent standard errors for area estimates on total forest land and reserved timberland; and percent standard errors for estimates of net volume, net annual growth, and annual mortality for live trees on total forest land and growing-stock trees (5.0 inches d.b.h. and greater) on nonreserved timberland, Nez Perce National Forest, 2001.

Land class or type of trees	Attribute	Area or volume	Percent standard error
Total forest land (acres)	Area	1,989,430	±1.2
Total forest land	Volume	6,756,560,000	±4.5
(all trees cubic feet)	Growth	102,007,970	±9.5
	Mortality	41,576,470	±19.0
Nonreserved timberland (acres)	Area	1,171,680	±1.7
Nonreserved timberland	Volume	4,444,760,000	±5.4
(growing-stock trees, cu. ft.)	Growth	67,848,970	±11.6
	Mortality	27,930,080	±22.4

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Selected data for this National Forest are part of a national data base that houses information for much of the forest land in the United States. This data base can be accessed on the Internet at the following web site:

http://fia.fs.fed.us/tools-data/

The Rocky Mountain Research Station develops scientific information and technology to improve management, protection, and use of the forests and rangelands. Research is designed to meet the needs of National Forest managers, Federal and State agencies, public and private organizations, academic institutions, industry, and individuals.

Studies accelerate solutions to problems involving ecosystems, range, forests, water, recreation, fire, resource inventory, land reclamation, community sustainability, forest engineering technology, multiple use economics, wildlife and fish habitat, and forest insects and diseases. Studies are conducted cooperatively, and applications may be found worldwide.