USDA
United States Department of Agriculture

Idaho's Forest Resources, 2006–2015

Chris Witt, R. Justin DeRose, Sara A. Goeking, and John D. Shaw

Forest Service | **Rocky Mountain Research Station** | **Resource Bulletin RMRS-RB-29** | **October 2018**

Witt, Chris; DeRose, R. Justin; Goeking, Sara A.; Shaw, John D. 2018. **Idaho's forest resources, 2006–2015.** Resour. Bull. RMRS-RB-29. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 84 p.

Abstract

This report presents a summary of the most recent Forest Inventory and Analysis data of Idaho's forests based on field data collected between 2006 and 2015. The report includes descriptive highlights and tables of area, numbers of trees, biomass, volume, growth, mortality, and removals. Most sections and tables are organized by forest type or forest-type group, tree species group, diameter class, or owner group. Results show that Idaho's forest land covers 21.6 million acres, of which 3 million acres (14 percent) are privately owned, and another 16.3 million acres (76 percent) are administered by the USDA Forest Service. The State's most abundant forest type is Douglas-fir, which covers more than 6 million acres. Subalpine fir is the most abundant tree species by number of trees 5.0 inches or greater in diameter, and Douglas-fir is the most abundant by volume and biomass. Idaho's forests contain 48 billion cubic feet of net volume in trees 5.0 inches diameter and larger. Annual net growth of all live trees 5.0 inches diameter and larger averaged 304.6 million cubic feet per year. Average annual mortality totaled 902 million cubic feet per year.

Keywords: forest inventory, FIA, Idaho, resources, timber

Front cover photo by Sara Goeking, U.S. Forest Service.
Back cover photo by Sara Goeking, U.S. Forest Service.

All Rocky Mountain Research Station publications are produced by U.S. Forest Service employees and are in the public domain and available at no cost. Even though U.S. Forest Service publications are not copyrighted, they are formatted according to U.S. Department of Agriculture standards and research findings and formatting cannot be altered in reprints. Altering content or formatting, including the cover and title page, is strictly prohibited.

Authors

Chris Witt is an Ecologist and a member of the Analysis Team with the Interior West Forest Inventory and Analysis Program at the USDA Forest Service's Rocky Mountain Research Station in Ogden, Utah. He holds B.S. and M.S. degrees in Ecology from Idaho State University (contact: chriswitt@fs.fed.us; 208-373-4370).

R. Justin DeRose is a Research Ecologist with the Interior West Forest Inventory and Analysis Program at the USDA Forest Service's Rocky Mountain Research Station in Ogden, Utah. He holds B.S. and M.S. degrees in Forestry from Utah State University and the University of Maine, and a Ph.D. in Forest Ecology from Utah State University.

Sara A. Goeking is a Biological Scientist and a member of the Analysis Team with the Interior West Forest Inventory and Analysis Program at the USDA Forest Service's Rocky Mountain Research Station in Ogden, Utah. She holds a B.S. degree in Environmental Science and a M.S. degree in Forest Ecology, both from Utah State University.

John D. Shaw is a Biological Scientist and Analysis Team Leader with the Interior West Forest Inventory and Analysis Program at the USDA Forest Service's Rocky Mountain Research Station in Ogden, Utah. He holds B.S. and M.S. degrees in Natural Resources Management from the University of Alaska Fairbanks, and a Ph.D. in Forest Ecology from Utah State University.

The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

Report Highlights

Forest Area

- Idaho's forest land area totals 21.6 million acres.
- Unreserved forest land accounts for most of the forest land in Idaho (82 percent) and totals 17.8 million acres.
- Almost 93 percent, or 16.5 million acres, of Idaho's unreserved forest land is classified as timberland and the remaining 7 percent is classified as unproductive forest land.
- Privately owned forest land totals 3 million acres, or 14 percent of Idaho's total forest land area.
- About 76 percent of Idaho's total forest land area, or 16.3 million acres, is administered by the USDA Forest Service.
- Douglas-fir is the most abundant forest type in Idaho, covering over 6 million acres and accounting for almost 29 percent of forest land.
- Lodgepole pine covers over 2.4 million acres and is the second most abundant forest type.

Numbers of Trees, Volume, and Biomass

- There are almost 7.5 billion live trees 1 inch or greater in diameter in Idaho.
- Softwood species total more than 6.8 billion trees or almost 92 percent of all live trees in Idaho.
- Numbers of subalpine fir trees 1 inch or greater in diameter total over 1.3 billion, making this species the single most abundant tree in Idaho.
- The net volume of live trees ≥5.0 inches diameter in Idaho on forest land totals 48 billion cubic feet.
- Growing-stock volume on timberland in Idaho totals 40.9 billion cubic feet, or 85 percent of the total live volume on forest land. Most of this volume occurs on National Forest System lands (77 percent percent), with 13 percent on private lands and 7 percent on State lands.
- The net volume of sawtimber trees on timberland is more than 210 billion board feet.
- The above-ground weight for all live trees one inch or greater in diameter on Idaho forest land is 849 million tons of oven-dry biomass.
- Commercial timber harvest in 2011 was 1.07 billion board feet (Scribner), most of which (45 percent percent) came from private industrial lands. The True firs species group, which includes Grand fir and subalpine fir species, accounted for the most harvested timber volume (35 percent).

Forest Health

- Gross annual growth of all live trees ≥5.0 inches diameter on Idaho forest land totaled 1.2 billion cubic feet. Net growth totaled about 305 million cubic feet.
- Average annual mortality of trees ≥5.0 inches diameter totaled about 902 million cubic feet. The leading causes of mortality were fire (40 percent of all mortality, by volume), insects (30 percent percent), and diseases (20 percent percent).
- Mortality exceeded gross growth for the three tree species groups with the greatest volume in Idaho, including true firs, lodgepole pine, and Douglas-fir.
- Twenty-two percent of Idaho's 2.57 billion live trees (≥5 inches in diameter) had a damage agent recorded, the majority being form defects.

- Lodgepole pine and Douglas-fir species accounted for 66 percent of all live trees damaged by insects.
- Whitebark pine trees are found outside of the whitebark pine forest type on 91 percent of plots in Idaho.
- Dead whitebark pine outnumber live in all but the smallest diameter classes.
- Insects and fire are the primary mortality agents for whitebark pine, accounting for 48 percent and 39 percent of total mortality, respectively.

Acknowledgments

The authors and FIA program extend special thanks to private landowners and tribal councils who graciously allowed our crews to access field plots located on their lands; and to the dedicated field staff who worked hard to collect high quality data. The Rocky Mountain Research Station gratefully acknowledges the invaluable cooperation and assistance of the U.S. Department of Agriculture; the U.S. Department of Energy; the Idaho Department of Lands; the Idaho Department of Fish and Game; the Idaho Department of Parks and Recreation; the Bureaus of Land Management and Indian Affairs; and the National Park Service, U.S. Department of the Interior. We are very grateful for the insightful comments by the reviewers of this document.

Contents

Introduction **1**
Accessing Idaho's Forest Inventory Data 1
History of Forest Inventory and Analysis in Idaho 1
Overview of Inventory Methods 2
Overview of Tables 2

Overview of Idaho's Forests **3**
Forest Land Area and Ownership 4
Forest Types and Forest-Type Groups 5
Numbers of Trees 6
Tree Volume and Biomass 7
Stand-Age Class 10
Understory Vegetation 11

Idaho's Forest Products Industry **13**

Forest Health In Idaho **15**
Growth, Mortality, and Removals 15
Forest Pests, Pathogens, and Other Damage Agents 22
Whitebark Pine Status and Trends 23

Conclusions **29**

References **30**

Appendix A. Standard Forest Inventory and Analysis Terminology **33**

Appendix B. Standard Forest Resource Tables **41**

Appendix C. Idaho Forest-Type Groups and Forest Types, With Descriptions and Timber (T) or Woodland (W) Designations **78**

Appendix D. Species Group, Common Name, Scientific Name, and Categorical Designations for Trees Measured in Idaho's Annual Inventory **84**

Introduction

Idaho encompasses a wide variety of environments and forest types that are valued for their scenic beauty, wood products, traditional forms of food and shelter, wildlife habitat, and ecological functions. This report contains highlights of the status of Idaho's forest resources, with discussions of pertinent issues based on data collected during the 2006–2015 evaluation period. This includes 10 years of inventory under the annual Forest Inventory and Analysis (FIA) system (Gillespie 1999).

This chapter briefly describes the recent implementation of the national FIA sample design in Idaho, as well as some basic differences between this inventory and previous FIA inventories of Idaho's forests. The following chapters describe specific inventory methods; an overview of traditional forest attributes measured by the FIA program, such as forest land area and timber volume; descriptions of selected resources that Idaho's forests provide; current issues and events affecting Idaho's forests; and comparisons of current forest attributes with previous forest inventories. The appendices include supplemental information, including a glossary of terms used in this report, standard forest resource tables, descriptions of forest types and forest-type groups, and a list of tree species found in Idaho.

Accessing Idaho's Forest Inventory Data

FIA data are publicly available from the national FIA website at fia.fs.fed.us. This site includes data downloads; online tools that allow users to perform custom queries; and documentation of FIA's field inventory protocols, database structure, and publications. Plot data may be downloaded in table form or summarized using a variety of online tools (https://www.fia.fs.fed.us/tools-data/default.asp). For assistance with finding information on this site or with performing custom analyses, data users are encouraged to contact one of the members of the Analysis Team of the Interior West FIA Program who are listed as authors at the beginning of this report.

The national FIA database contains data from the 1991 periodic inventory as well as annual forest inventory data, which are updated each year as additional measurements are collected. Data collected from each annual inventory plot are assigned an inventory year that corresponds to the year in which the plot was scheduled for measurement on a 10-year remeasurement cycle.

History of Forest Inventory and Analysis in Idaho

Prior to implementation of the annual forest inventory in 2004, Idaho's forest attributes were estimated from periodic inventories that were conducted over a period of 2 to 5 years and repeated roughly every 10 years. Because these inventories were conducted periodically, they are referred to as periodic inventories. The most recent periodic inventories of Idaho's forest resources were completed in 1981 (Benson et al. 1987) and 1991 (Brown and Chojnacky 1996). In 2004, data in

Idaho began to be collected under the current annualized system and a 5-year report covering data collected in 2004–2009 was produced in 2012 (Witt et al. 2012).

Data from new inventories are often compared with data from earlier inventories to quantify forest trends. However, for the comparisons to be valid, the procedures used in the inventories must be compatible. Idaho's procedures for past periodic inventories are different enough from present procedures that direct comparisons between them are not recommended. However, data from the 5-year report was collected under the same methodologies and therefore can be used to look for trends over the time between it and this report.

Overview of Inventory Methods

The annual forest inventory of Idaho's forests follows sampling procedures specified by Federal legislation and the national FIA program. In 1998, the Agricultural Research Extension and Education Reform Act, which modified portions of the 1996 Farm Bill, mandated that inventories would be conducted throughout the forests of the United States on an annual basis. This annual system integrates FIA and Forest Health Monitoring (FHM) sampling designs into a mapped-plot design, which includes a nationally consistent plot configuration with four fixed-radius subplots; a systematic national sampling design consisting of one plot per approximately 6,000 acres; annual measurement of a constant proportion of permanent plots; data or data summaries within 6 months after yearly sampling is completed; and a State summary report every 5 years. The inventory strategy for the Western United States involves measurement of 10 systematic samples, or subpanels, where one subpanel is completed each year and all subpanels are measured over a 10-year period. Each subpanel is pre-assigned to be surveyed during a specific calendar year, which is referred to as inventory year (see Appendix A for standard FIA terminology). The year in which each plot was actually surveyed is recorded as its measurement year. In most States, inventory year and measurement year are the same for the vast majority of field plots. FIA's statistical sampling and estimation procedures are described in more detail in Bechtold and Patterson (2005). This report is based on a complete 10-year cycle of forest monitoring data. The aggregated dataset includes a total of 8,996 plots, where 3,772 plots contained at least one forested condition. These data reflect the accessible forest land measured in Idaho for the 2006-2015 evaluation period. Unless otherwise noted, area values represent all forested land in Idaho and volume and number of trees reflecting trees 5 inches or greater in diameter.

Overview of Tables

Core FIA attributes are reported for Idaho's forests, 2006–2015, in Appendix B, tables B1–B37. These tables encompass statistics for land area, numbers of trees, wood volume, biomass (oven-dry weight), growth, mortality, and sampling errors. Table B1 is the only table that includes all land cover types, and it summarizes the proportions of sample plots that were recorded as forest, nonforest,

and nonsampled (e.g., due to inaccessibility). All other tables exclude nonforest/nonsampled land and therefore include only accessible forest land (see Appendix A for definition). Table B37 shows sampling errors for area, volume, net growth, and mortality at the 67 percent confidence level.

This report also contains supplemental tables within the body of the report. To avoid confusion between supplemental tables found in individual report chapters and the standard FIA tables found in Appendix B, supplemental tables in the body of this report are labeled consecutively as they appear, beginning with table 1. Standard tables will be referred to beginning with the appendix letter followed by the table number (e.g., table B1).

Overview of Idaho's Forests

This chapter summarizes the current status of Idaho's forests in terms of traditional forest attributes such as forest ownership, forest type, stand age, number of trees, volume, biomass, growth, mortality, and understory vegetation. Nearly all attributes are based directly on FIA measurements, except where noted in individual sections. FIA uses a nationally consistent standard for defining different categories of forest land based on reserved status and productivity. These categories were originally developed for the purpose of separating forest land deemed suitable for timber production from forest land that was either not suitable or unavailable for timber harvesting activity, which includes woodland forest types.

The first division of forest land is unreserved forest land and reserved forest land. Unreserved forest land is considered available for harvesting activity where wood volume can be removed for wood products. Reserved forest land is considered unavailable for any type of wood utilization management practice through administrative proclamation or legislation. Both unreserved and reserved forest lands are further divided based on productivity. Unreserved forest land is subdivided into timberland and unproductive forests. Timberland is defined as unreserved forest land capable of producing 20 cubic feet of wood per acre per year of trees designated as a timber species. Unproductive forests, because of a combination of species' characteristics and site conditions, are not capable of producing 20 cubic feet of wood per acre per year of trees designated as a timber species (see Appendixes C and D). Reserved forest land is also divided into productive and unproductive forests. Some characteristics that contribute to productivity can be visibly obvious, such as the presence or absence of non-commercial species, rocky substrates, steep slopes, and high elevation. While these distinctions may be important for understanding reserved area management concerns (e.g., their effect on visitor experience), wood production capability on reserved forest land is useful only as a potential indicator of non-timber values, such as wildlife habitat and carbon accounting. Also of note: FIA does not define roadless areas as reserved, so these areas are not included in the estimates of reserved forest in Idaho.

Forest Land Area and Ownership

The State of Idaho encompasses 53.5 million acres of land area, of which 21.6 million acres (39 percent) are estimated to be forest land by FIA (table B1). Unreserved forest land accounts for 83 percent of the forest land in Idaho and totals 17.8 million acres. Timberland constitutes almost 77 percent (16.5 million acres) of Idaho's forest land, and the remaining 23 percent (5.1 million acres) of unreserved forest land is classified as reserved and/or unproductive forest land. Reserved forests account for 17 percent (3.8 million acres) of total forest land in Idaho.

Idaho's forests are distributed among several ownerships that are geographically dispersed throughout the State. The USDA Forest Service's National Forest System (NFS) is responsible for more forest land in Idaho than all other land ownership and management groups combined (table B2). Forest land administered by NFS totals 16.3 million acres, or 76 percent of the State's total forest land area (fig. 1). More than 77 percent, or 12.6 million acres, of the forest land managed by NFS is classified as unreserved forest land. About 95 percent, or 11.9 million acres, of unreserved forest land managed by NFS is further classified as timberland, while the remaining 5 percent is classified as unproductive (table B2). The net volume of live trees (table B12), as well as the average annual tree mortality (table B25), is higher on NFS lands than any other owner class. Net growth in Idaho is currently highest on private lands (table B23).

Private landowners are Idaho's second-largest manager of forest land, and they manage about 3 million acres of forest land. This represents nearly 6 percent of Idaho's total land area and 14 percent of its forest land area. Idaho's diverse array of private landowners consists of private individuals/families, corporations, tribes, and non-governmental organizations such as private associations or conservation groups. Although conservation easements cover thousands of acres of

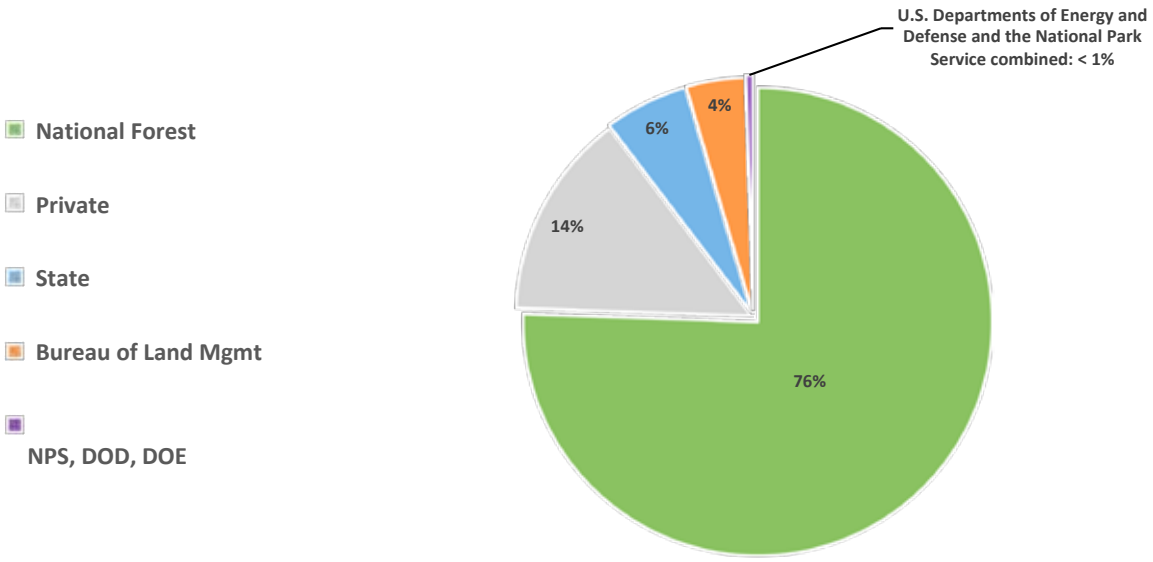

Figure 1—Percentage of all forest land by owner class, Idaho 2006–2015.

private land, all private forest land is categorized as unreserved. An estimated 2.9 million acres, or 93 percent of all private forest land, are classified as timberland while 204 thousand acres are classified as unproductive and unreserved forest land.

Other public agencies managing large portions of Idaho's forest land include the Bureau of Land Management (BLM), the Departments of Defense and Energy (DOD/DOE), the National Park Service (NPS), and the State of Idaho. The State government manages 1.2 million acres, or 6 percent of the forest land in Idaho. All of Idaho's State-managed forest land is classified as unreserved, and about 1.1 million acres qualify as unreserved timberland. The BLM manages nearly 874,000 acres, or 4 percent of the State's forest land, and the NPS manages 58,000 acres, or less than 1 percent. Another 41,000 acres are managed by the DOD/DOE.

Forest Types and Forest-Type Groups

Forest type is a classification of forest land based on the species forming a plurality of living trees growing in a particular forest. Forest-type names may be based on a single species or groups of species. Forest types are an important indicator of diversity, structure, and successional stage. The distribution of forest types across the landscape is determined by factors such as climate, soil, elevation, aspect, and disturbance history. The loss or gain of a particular forest type over time can help assess the impact of major disturbances related to fire, weather, climate, insects, disease, and human-caused disturbances such as timber harvesting or ecosystem restoration.

Forest types are aggregated into forest-type groups to simplify interpretation of large-scale forest trends. Idaho's forests are represented by 14 forest-type groups that are further classified into 25 distinct forest types, all of which are described in Appendix C. Some forest-type groups contain only one forest type, while other forest-type groups include several individual forest types. An example of a forest-type group with multiple forest types is the Pinyon/juniper forest-type group, which consists of the Rocky Mountain juniper forest type, the Pinyon/juniper forest type, and the Juniper woodland forest type. The distribution of forest types as well as individual tree species may vary among ecological provinces.

Idaho's most abundant forest-type group is the Fir/spruce/mountain hemlock group, which covers almost 6.3 million acres and accounts for 29 percent of forest land in the State (fig. 2, table B3). Within this group, the Grand fir forest type is most abundant (2.3 million acres), followed closely by both the Engelmann spruce/subalpine fir (1.71 million acres) and the Subalpine fir (1.69 million acres) forest types. Idaho's second most abundant forest-type group is the Douglas-fir group, which comprises 6.2 million acres, or 28.6 percent of the State's forest land. This forest-type group includes only the Douglas-fir forest type. The Lodgepole pine forest-type group is Idaho's third most abundant group, covering 2.4 million acres and making up around 11 percent of the State's forest land. Similar to the Douglas-fir group, the Lodgepole pine group has only the Lodgepole pine forest type in it. The Douglas-fir and Lodgepole pine group estimates show little change from 1991 estimates, but the Fir/spruce/mountain hemlock group estimate increased enough

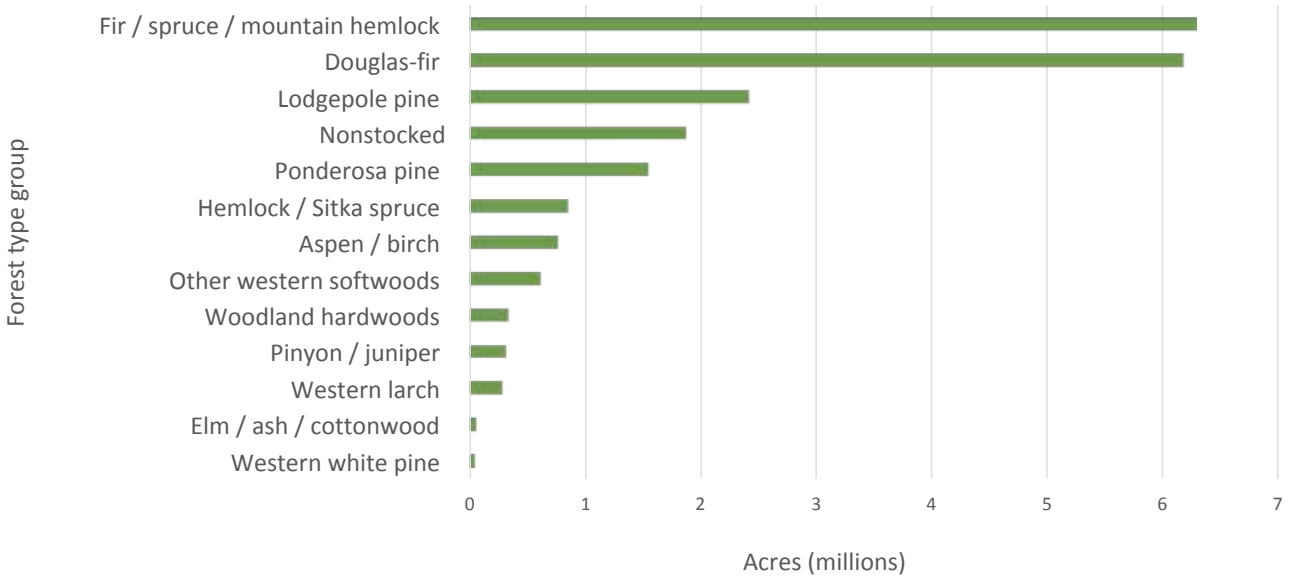

Figure 2—Area of land by forest type group, Idaho, 2006–2015. Only those groups having 10 or more plots sampled are listed. See appendices C and D for forest types and species included in each group.

over this time period to overtake Douglas-fir as the most abundant group in Idaho. Still, differences between these groups are within the error of the estimates.

Numbers of Trees

Estimates of the numbers of trees are beneficial to a variety of silvicultural, forest health, and habitat management applications. These estimates are typically combined with information about the size and species of the trees to provide meaningful summaries of forest dynamics and stand structure. Younger forest stands usually consist of large numbers of small-diameter trees, whereas older forest stands contain small numbers of large-diameter trees. FIA classifies individual tree species into species groups and also categorizes each species and species group as either softwood or hardwood (Appendix D).

Idaho contains an estimated 7.5 billion live trees ≥1 inch in diameter and just over 814 million dead trees 5 inches in diameter or larger (table B10). This represents a 4 percent decrease from the 2009 estimate (Witt et al. 2012), with subalpine fir accounting for much more than any other species (126 million fewer trees or 37 percent of the total estimated decrease). Most of the total decrease (68 percent) and the decrease in subalpine fir (also 68 percent) occurred on reserved forestland. Softwood species total 6.9 billion trees or 92 percent of the State's live trees. Around 64 percent of live softwood trees are under 5.0 inches in diameter and a little over 5 percent are 15.0 inches and larger in diameter. The True fir species group accounts for 37 percent (2.6 billion live trees) of the softwood trees. Subalpine fir is the most abundant tree species in this group with 1.3 billion trees, accounting for almost 20 percent of the live softwood trees in Idaho. The second most abundant softwood group is the Douglas-fir group with 1.3 billion trees, all of which are Douglas-fir. Third and fourth in abundance are, respectively, the

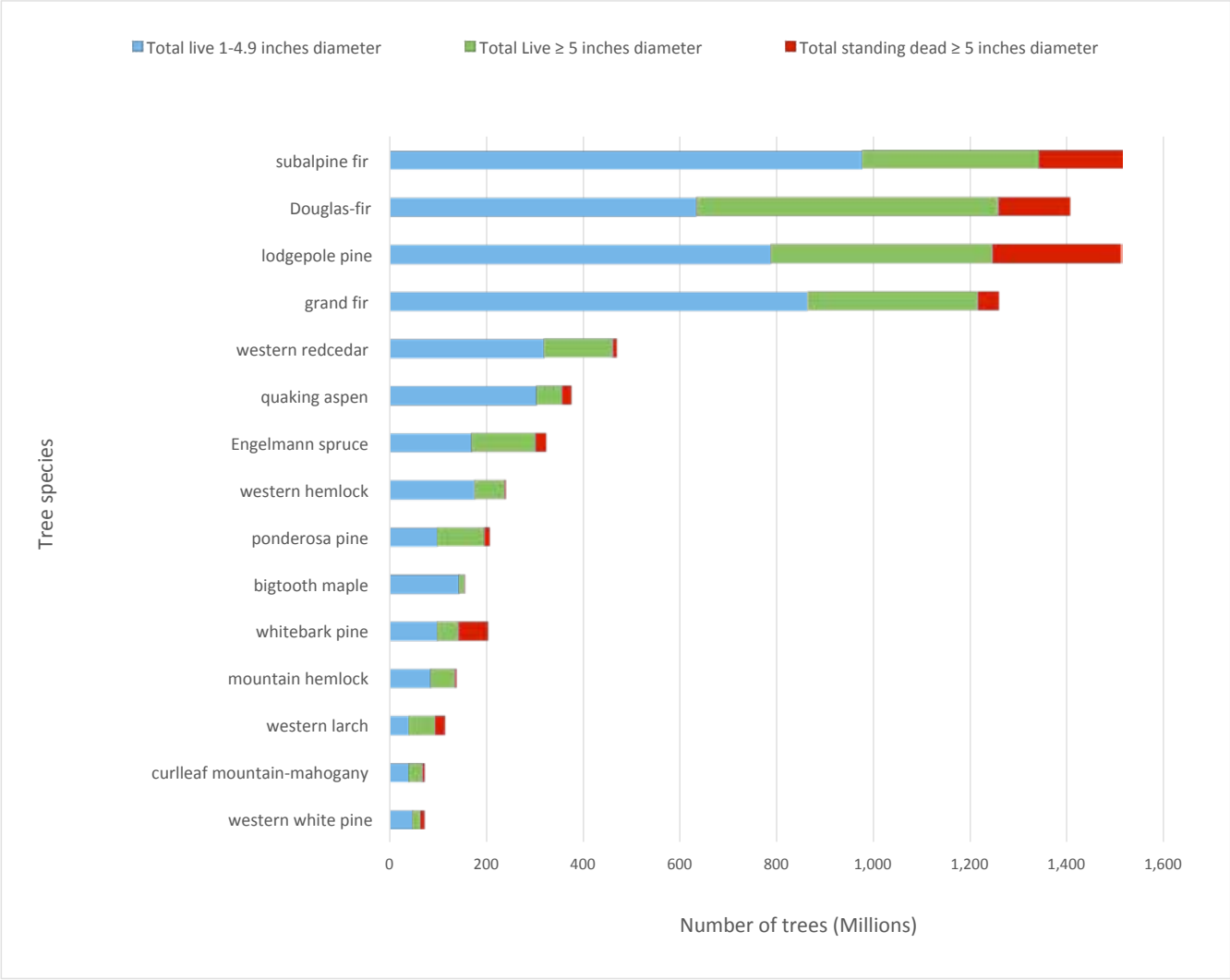

Figure 3—Ratio of live and standing dead trees 5 inches or greater d.b.h./d.r.c., and total number of live trees 1–4 inches d.b.h./d.r.c., by common species, Idaho, 2006–2015.

Lodgepole pine group with 1.2 billion trees and Western redcedar species group with 460 million trees. Figure 3 presents the estimated number of live and standing dead trees for the 15 most abundant species in Idaho (those with greater than 50 million live trees).

Hardwood species account for 635 million trees ≥1 inch in diameter, or 8 percent of Idaho's live trees. Three species groups make up all hardwoods in Idaho. The Cottonwood and aspen species group comprises the majority (58 percent) of the hardwood species, with 364 million trees. Aspen trees make up the large majority of hardwood trees (98 percent) and of these, 85 percent are under 5 inches in diameter. The second most abundant hardwood group is the Western woodlands hardwoods species group, which consists of 224 million trees. In Idaho, this species group includes curlleaf mountain-mahogany and bigtooth maple.

Roughly 4.9 billion, or 66 percent, of Idaho's trees are less than 5 inches diameter at breast height (d.b.h.). A pattern of many smaller trees compared to larger ones is expected for most species, but it also illustrates the different life histories

of various tree species. For example, hardwood species such as bigtooth maple and quaking aspen have a very large percentage of trees in the small-diameter classes (less than 5 inches diameter) at 95 percent and 85 percent, respectively, as these species do not generally grow to large diameters. In contrast, all other species have less than 75 percent of their total numbers in these small-diameter classes. Of the species with greater than 50 million trees in Idaho, Western larch has the lowest percentage of trees in the small-diameter classes with 43 percent.

Tree Volume and Biomass

The amount of cubic-foot volume of wood in a forest is important for determining the sustainability of current and future wood utilization. The forest products industry and forest managers are interested in knowing the tree species composition and size distribution, as well as the geographic location and ownership status, of available wood volume. Estimates of gross and net volume (e.g., cubic-foot or board-foot) include only the merchantable portion or sawlog portion of live trees. Net volume is computed by deducting rotten, missing, or form defects from gross volume. Net volume is reported as net volume of all live trees, net volume of growing-stock trees, net volume of sawtimber, and net volume of sawlogs. All of these terms are defined below as well as in Appendix A. Tree biomass estimates are based on gross volumes and describe above-ground tree weight (oven-dry) by various components (merchantable bole and bark, tops and limbs, saplings). This method of estimating tree biomass is referred to as the component ratio method, and it is described by Woudenberg et al. (2010). Note that FIA's biomass estimates are produced in units of oven-dry weight. Estimates of bone-dry weight can be calculated using the following conversion: one bone-dry unit equals 2,400 pounds of oven-dry wood (Morgan et al. 2006).

Tables B12 through B18 show the net volume of all live trees ≥5 inches in diameter on Idaho's forest land, by various categories. The net volume of all live trees on Idaho's forest land totals 48 billion cubic feet, 86 percent (41.1 billion cubic feet) of which resides in unreserved timberland (table B12). Just under 80 percent of the live volume found in unreserved timberland, or 38.2 billion cubic feet, is located on lands managed by the National Forest System (NFS). About 16 percent of the NFS-managed volume exists on reserved lands and is unavailable for harvest. Privately owned forests contain 11 percent of the State's total live volume, or 5.4 billion cubic feet. Roughly 3 percent, or 1.5 billion cubic feet, exists on lands managed by various Federal agencies other than the National Forest System. The remainder, about 2.9 billion cubic feet, is on lands managed by State government.

Live volume of trees ≥5 inches in diameter can also be reported by forest-type group and tree species group. With an estimated 19.1 billion cubic feet, the Fir/spruce/mountain hemlock forest-type group contains more live-tree volume than any other forest-type group (table B13). However, the Douglas-fir *species* group (which contains only the single species Douglas-fir) contains more live-tree volume (14 billion cubic feet) than any other species group (table B14). As

Douglas-fir is the only species in the Douglas-fir group, this species also contains the most volume of any single species of tree in Idaho. The True fir group is second in live volume at 13.4 billion cubic feet and includes both grand fir and subalpine fir species.

Idaho has over 10.3 billion cubic feet of standing dead trees ≥5 inches in diameter in its forests. The Lodgepole pine species and species group contain the highest amount of volume with 2.7 billion cubic feet, but the Fir/spruce/mountain hemlock forest-type group contains the most standing dead volume of any forest-type group, with 3.7 billion cubic feet, or 36 percent of the total standing dead volume in the State.

The availability of timber volume for harvest is affected by three primary factors: reserved status, productivity, and merchantability. Timberland is defined as unreserved forest land capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment. Merchantability refers to growing-stock trees, which are at least 5 inches in diameter and contain, or have the potential to produce, an 8-foot sawlog that is reasonably free of defects. Therefore, growing-stock volume on timberland represents the amount of timber that is potentially available for harvest. The net volume of growing-stock trees on timberland in Idaho totals just under 41 billion cubic feet (table B17), or 85 percent of the total live volume on forest land.

The distribution of growing-stock volume varies by species or species group and also by owner class (table B18). Across all owner classes, half of the State's growing-stock volume is composed of two species: Douglas-fir and grand fir. Douglas-fir constitutes 29 percent of Idaho's growing-stock volume, or 12 billion cubic feet, and grand fir contains 21 percent, or 8.5 billion cubic feet. National Forest System lands include 31.5 billion cubic feet, or 77 percent of the State's growing stock. Privately owned lands hold the second most growing-stock volume with over 5.2 billion cubic feet, or 13 percent of the total growing stock on Idaho timberland. State-managed lands contain 2.9 billion cubic feet of growing stock, or 7 percent of the State's total. The net live volume of sawtimber trees, which are defined as softwood trees 9.0 inches in diameter or larger, or hardwood trees 11.0 inches in diameter or larger (international ¼-inch rule), total 210 billion board feet (table B19). Volume of sawtimber trees has seen an increase of roughly 10 billion cubic feet from the 2009 estimates. Most of this change (7.5 billion cubic feet) is found in the larger diameter classes of Douglas-fir and True fir species groups.

The total weight of oven-dry above-ground biomass on Idaho's forest land is 849 million tons, 59 percent (498 million tons) of which exists in the Douglas-fir (284 million tons) and True fir (214 million tons) species groups (table B30). Although biomass is typically sold by green weight, the water content of wood is highly variable geographically, seasonally, and even across portions of a single tree. Therefore, live-tree inventory estimates of green biomass may be unreliable or even misleading. In contrast, oven-dry weight does not change due to fluctuations in tree water content.

Table 1—Net volume (cubic feet per acre) of live trees 5.0 inches diameter and larger, and biomass (tons per acre) of live trees 1.0 inch diameter and larger, averaged by common forest types. Idaho, 2006–2015.

Forest type	Number of plots	Volume (cubic feet/acre)	Biomass (tons/acre)
Western redcedar	106	5763	88
Western hemlock	53	4149	77
Grand fir	399	4079	69
Mountain hemlock	41	4026	74
Engelmann spruce	69	3545	54
Engelmann spruce / subalpine fir	293	2866	45
Western larch	48	2561	49
Douglas-fir	1,104	2401	46
Ponderosa pine	275	2085	38
Lodgepole pine	401	1614	29
Subalpine fir	300	1561	26
Whitebark pine	44	836	16
Aspen	142	655	14
Juniper woodland	47	484	10

Volume and biomass can also be expressed in terms of the amount per acre. Table 1 shows live-tree volume (in cubic feet per acre) and biomass (in tons per acre) by forest type. The estimates for each forest type include all of the different species that occur within that forest type. Because estimates for forest types with small samples may not be representative, only forest types sampled on at least 20 plots are included in this discussion. The Western redcedar forest type has the highest per-acre net volume of live trees 5.0 inches diameter and larger, with 5,763 cubic feet per acre, and also has the highest biomass of live trees 1.0 inches diameter and larger with 87.6 dry tons per acre. Not surprisingly, the forest types with the five largest net volumes and biomasses are all timber types. The woodland forest type with the highest per-acre net volume and biomass is the Pinyon-juniper forest type, with 842 cubic feet per acre and 16.4 dry tons per acre.

Stand-Age Class

The age structure of forest land provides insight into prospective shifts in stand structure and composition over time. On every FIA plot that samples forest land and includes suitable trees for increment core extraction, stand age is estimated based on the average age of only those trees that fall within the calculated stand-size category. For example, suppose an FIA plot sampled a softwood forest type where about 30 percent of the live trees were in the large-diameter stand size class (trees at least 9.0 inches d.b.h. and larger) and 70 percent were in the medium-diameter size class (trees between 5.0 and 9.0 inches d.b.h.). The stand would be classified as a medium-diameter stand-size class, and therefore only the medium size trees would be used in determining stand age.

There are limitations to collecting data for stand-age computation. Repeatable measurements of increment cores are difficult to collect from certain tree species, particularly woodland species or those that may be very long-lived. Stand age may not accurately depict the age structure of uneven-aged stands, which encompass multiple age-classes. Stand ages are difficult to accurately determine for stands that are predominated by small-diameter tree species such as Gambel oak trees. Stand ages are not assigned to nonstocked conditions, which are stands that contain less than 10 percent stocking of live trees because of disturbance.

Table B6 shows the area of forest land, by age class and forest-type group, with 20-year intervals representing stand-age classes. Over half of Idaho's forest land, or 10.9 million acres, is between 60 and 140 years of age. Stands between 80 and 100 years of age represent the largest single 20-year age class and comprise 3.4 million acres, or 16 percent of Idaho's forest land area. Forests younger than 60 years cover 7.6 million acres, while forests older than 140 years cover 3.1 million acres.

Most of the major forest-type groups in the State are either young or moderately aged. Three of the five most abundant forest-type groups (Douglas-fir, Ponderosa pine, and Spruce/fir/mountain hemlock) have more forest land area in the 61–120 year age-classes than any other class, while another, the Lodgepole pine group, has more acres in the 1–20 year class. Both the Ponderosa pine and Douglas-fir forest-type groups have a very small proportion of forest land area that is younger than 60 years. Compared to these coniferous forest-type groups, aspen forests have a much higher percentage of its acreage that is younger than 20 years (40 percent). Conversely, only 3 percent of aspen forest area is older than 100 years.

Understory Vegetation

The structure and composition of understory vegetation affect the overall diversity, productivity, and habitat quality of forested ecosystems. Understory vegetation data are collected on all Phase 2 plots using two distinct protocols that characterize overall vegetation structure and composition. Under the vegetation structure protocol, FIA field crews record the height class and percent cover that is occupied by each of four plant growth habits: forbs, graminoids, shrubs, and understory trees (trees less than 5.0 inches in diameter). Under the species composition protocol, the following variables are recorded for plant species that individually occupy at least 3 percent of the ground area: height class, growth habit, and percent cover. If more than four species occupy more than the cover threshold, then only the most abundant four species per life form are recorded. Note that the vegetation structure protocol also includes all species that have less than the minimum thresholds for being recorded under the species composition protocol. On plots where many species are present but where each species occupies less area than the cover threshold for individual species, there are no species recorded under the species composition protocol. However, cover of these species in aggregate (and within the same growth habit) will be recorded using the understory structure protocol.

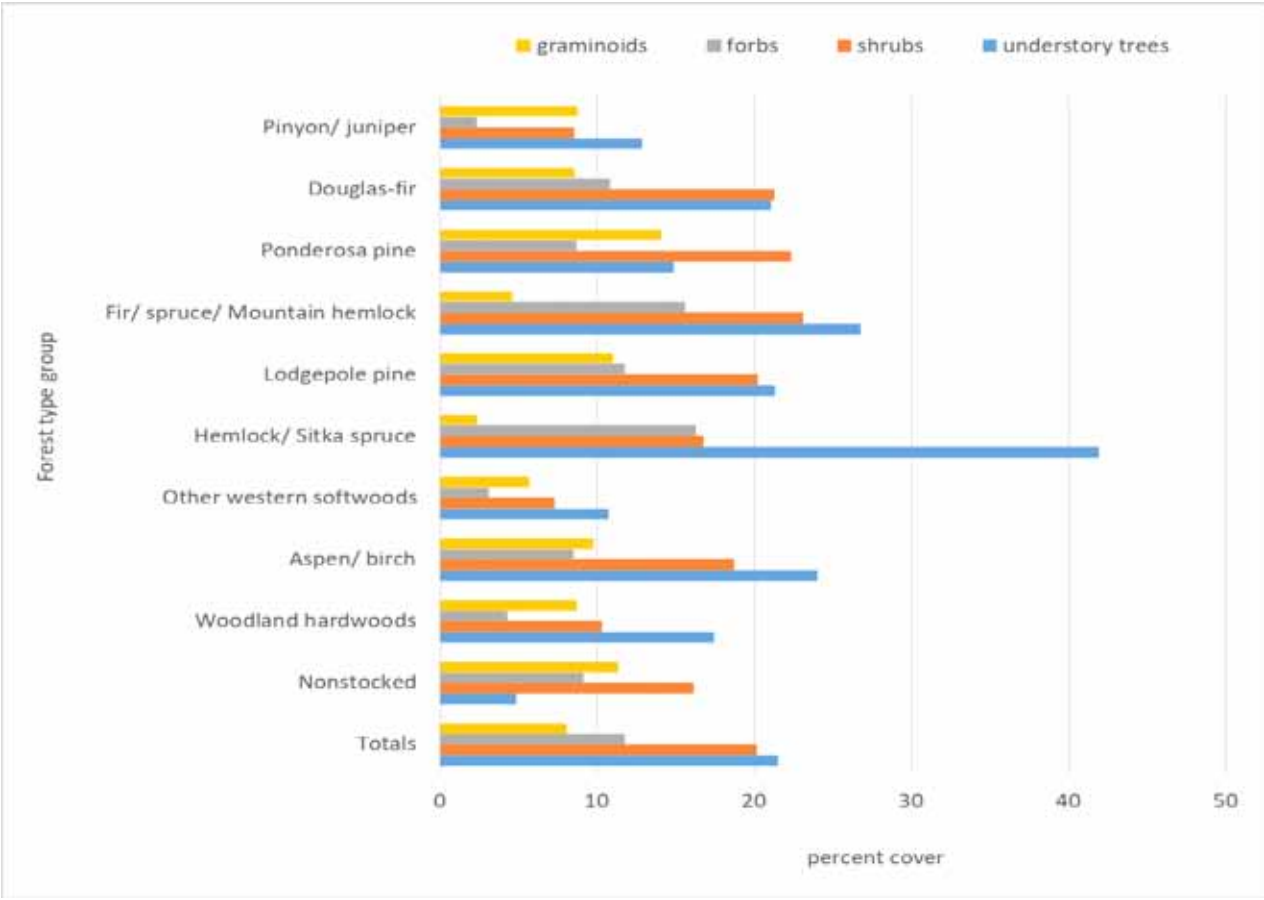

Figure 4—Average cover of understory growth habits by major forest type group. Idaho, 2006–2015.

Figure 4 depicts the average percent cover of each plant growth habit within each of Idaho's 10 most abundant forest-type groups. This analysis was completed by summarizing data from FIA's protocols for understory vegetation structure, where the average cover of each life form was calculated for each plot and cover across plots were averaged within each forest type. Understory trees cover more area than the other three growth habits in all forest types except for Douglas-fir, Ponderosa pine, and Nonstocked forest-type groups. Average understory tree cover ranges from 0 percent in nonstocked forest areas to 42 percent in Hemlock/Sitka spruce forests. After understory tree cover, shrubs are the plant growth habit with the highest average cover in most forest-type groups. The lone exception to this pattern is the Pinyon/juniper group, which has a slightly higher cover of graminoids than shrubs. The Pinyon/juniper group also has the lowest average forb cover of any forest-type group in Idaho, while the Hemlock/Sitka spruce group has the lowest graminoid cover, the Other western softwoods group has the lowest shrub cover, while Nonstocked stands have the lowest tree cover.

A total of 690 individual plant species were recorded on Idaho's forest inventory plots. The four most frequently recorded species within each growth habit are listed in table 2. Thinleaf huckleberry (*Vaccinium membranaceum*) was the most frequently recorded species, occurring on 52 percent of the Engelmann spruce/

Table 2—The four most frequently recorded understory species in each growth habit, as well as the number of plots that were found. Idaho, 2006–2015.

Growth habit	Species	Common name	Plots recorded
Trees	*Pseudotsuga menziesii*	Douglas-fir	995
	Abes lasiocarpa	Subalpine fir	936
	Acer glabrum	Rocky Mountain maple	931
	Abes grandis	Grand fir	906
Shrubs	*Vaccinium membranaceum*	Thinleaf huckleberry	1090
	Symphoricarpos albus	Common snowberry	763
	Physocarpus malvaceus	Mallow ninebark	641
	Spiraea betulifolia	White spirea	595
Forbs	*Xerophyllum tenax*	Common beargrass	709
	Arnica cordifolia	Heartleaf arnica	466
	Coptis occidentalis	Idaho goldthread	438
	Pteridium aquilinum	Western brackenfern	335
Graminoids	*Calamagrotis rubescens*	Pinegrass	1048
	Carex geyeri	Geyer's sedge	762
	Carex L.	Sedge spp.	277
	festuca idahoensis	Idaho fescue	238

subalpine fir plots and 29 percent of all forested plots in Idaho. Forb diversity appears to be much higher in Idaho's forests than other growth habits. There were 382 forb species recorded with at least 3 percent cover, while the next most diverse growth habit was shrubs with 141 species recorded. Graminoids had 122 species and understory trees had only 45 species. While understory tree diversity paled in comparison to that of forb diversity, the most ubiquitous understory tree species in table 2 were encountered much more frequently than the most common forb species listed. So while overall forb diversity was relatively high, no single forb species occurred more often than any of the top four trees or the top two graminoids and shrubs.

Idaho's Forest Products Industry

The University of Montana's Bureau of Business and Economic Research (BBER), in cooperation with the Interior West FIA Program, conducts periodic censuses of Idaho's primary forest products industry, the most recent census being conducted in 2011 (Simmons et al. 2014). This section summarizes key aspects of the 2011 industry census, including timber harvest levels by product and ownership class.

The commercial timber harvest in Idaho in 2011 was 1.07 billion board feet Scribner, which was over 40 percent higher than the previous census in 2009. However, it should be noted that the 2009 harvest was a record low for Idaho. About 45 percent of the 2011 harvest came from private industrial forests (484 million board feet Scribner), with the remaining harvest coming from public lands (451 million board

feet Scribner) and non-industrial private lands (130 million board feet Scribner). This represents a shift from harvest on private to public lands between 2001 and 2011, where private lands produced close to 75 percent of the total board-foot volume in Idaho in 2001 versus about 57 percent in the latest survey. A corresponding 17 percent increase in output is seen on public lands over the same period.

Primary forest products facilities process timber (i.e., logs) into manufactured products such as lumber and also include facilities that use bark or wood residue directly from timber processors. There were 88 primary wood facilities active in Idaho in 2011, including 27 saw mills, 18 facilities that make residue products, 17 post/pole/furniture manufacturers, and 16 log home facilities. Other primary wood industries operating in Idaho include cedar production and plywood/veneer plants. Idaho's forest products industry produced sales of $1.4 billion in 2011, with residue related products such as pulp, paper, and particleboard representing 56 percent of the total. Lumber and plywood contributed the second most sales, accounting for 36 percent of the total.

Idaho's major timber species (Simmons et al. 2014; Witt et al. 2012) were found to be the leading species harvested in the 2011 census, with true firs (grand fir and subalpine fir) accounting for 35 percent of harvest volume, followed by Douglas-fir (24 percent), western redcedar (12 percent), and ponderosa pine (10 percent). In terms of geographic differences in timber harvest within the State, counties north of the Salmon River continue to produce most (nearly 90 percent) of the timber in Idaho. Clearwater County leads the State in harvest at 222 million board feet (21 percent), followed by Benewah (156 million board feet) and Shoshone (137 million board feet) Counties. Valley County had the highest harvest total in southern Idaho with 47 million board feet.

Sustainability of Idaho's forests depends, in part, on management activities that generate sustainable harvest levels and support a forest products industry. Statewide, average annual gross growth of growing-stock trees on timberland was 1.1 billion cubic feet. When average annual growing-stock mortality on timberland (622 million cubic feet; table B28) is taken into account, average annual net growth of growing-stock trees on timberland was 451 million cubic feet, just slightly less than that of the previous 2009 inventory. Tree mortality on Idaho's timberlands not only has an impact on the forest inventory, but also influences harvest-to-growth relationships, sustainability, and the availability of timber for the forest products industry.

The forest products industry includes private sector foresters, loggers, and other forest workers, as well as employees at primary and secondary wood and paper products manufacturing facilities. Employment data from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (U.S. Dept. of Commerce, BEA 2013) showed employment in the State's forest products industry totaled about 2,300 workers in 2012, or about 29 percent less than in 2007. The State's industry, like much of the U.S. West, continues to wrestle with the impacts of steep timber harvest reductions from Federal lands from the 1990s (Keegan et al. 2006; Morgan et al. 2006), as well as the more recent Great Recession and U.S. home-building collapse (Keegan et al. 2012). Recovery

of U.S. home-building and increasing domestic demand for wood products are offering some potential for timber harvest increases and improved forest industry operating conditions in Idaho.

Forest Health In Idaho

Growth, Mortality, and Removals

The change in volume over a given time period in a forest inventory is influenced by ingrowth of new trees, continued growth on existing trees, mortality, and removals. Growth can be expressed as gross growth, and also as net annual growth, which is defined as the gross growth minus the volume lost to mortality. Mortality is expressed as the average annual net volume of trees that died over a given time period due to natural causes and excludes the volume that is removed through harvesting. Tree mortality occurs at low and predictable rates due to factors such as insects and disease, self-thinning, or advanced tree age. Occasionally, highly concentrated and localized losses occur due to insect and disease epidemics, wildfire, or severe weather events. Removals represent the net volume of growing-stock trees removed from the inventory by harvesting or other cultural operations (such as forest restoration or timber-stand improvement), by land clearing, or by changes in land use (such as designation as Wilderness or other reserved status).

Growth and mortality can be assessed in one of two ways: (1) by using measurements of the same plot at two points in time, or (2) based on a single inventory, as described below. However, removals cannot be reliably estimated without having two points-in-time measurements of the same set of plots. Remeasurement of annual plots in Idaho began in 2014 (see next paragraph), and therefore recent removals can only be estimated using information about the amount of wood cut and processed by the forest products industry. Because of this difference in analysis methods, gross growth, mortality, and net growth are analyzed here, while removals are discussed in the *Idaho's Forest Products Industry* section of this report.

In Idaho, the procedures used to estimate tree growth and mortality depended on the remeasurement status of the annual plot. A remeasured plot refers to a plot where an inventory plot was established in the previous inventory (time 1), and the field crews were able to relocate the plot during the current inventory (time 2) and account for all trees previously measured. In the current inventory (2006–2015), over 19 percent of all plots that sampled forest land in Idaho were remeasured, so the same trees were measured at two points in time. The time interval between remeasured plots in Idaho varied from 3 to 11 years and averaged 10 years. For trees that were alive at time 1 and time 2, growth is calculated based on the change in volume over the time interval between plot visits. On remeasurement plots, mortality volume is based on the volume of any tree that qualifies as a mortality tree over the time interval between plot visits. A tree is classified as mortality if it was alive at time 1 but dead at time 2. On new plots—plots established for the first time where there was no previous co-located plot to be measured—annual growth is estimated from the previous 10 years

of radial growth taken from increment cores, and mortality is estimated from trees that died in the 5 years prior to the year of measurement.

There were an estimated 1.2 billion cubic feet of gross annual growth for all live trees 5.0 inches diameter and greater on forest land in Idaho. Interestingly, gross growth for the previous reporting period (2004–2009) was also approximately 1.2 billion cubic feet per year (Witt et al. 2012). Gross growth is the sum of growth on all survivor and ingrowth trees. Survivor trees are live trees 5.0 inches and larger in diameter at time 1 and still alive at time 2 on remeasured plots, and live trees determined to be 5.0 inches and larger in diameter 10 years prior to the current measurement on new plots. Ingrowth trees are live trees 5.0 inches and larger in diameter that grew over the 5.0-inch threshold between time 1 and time 2 on remeasured plots or during the previous 10 years. The average annual mortality of trees 5.0 inches and larger in diameter was 902.4 million cubic feet (tables B25–27). Therefore, net growth, calculated as gross growth minus mortality, was 304.6 million cubic feet for the 2006–2015 inventory period in Idaho.

The 304.6 million cubic feet of net annual growth in Idaho indicates an inventory of live trees that is increasing annually in the absence of trees removed from human-caused activities (i.e., removals). There was a 19 percent reduction in net annual growth, and an 11 percent increase in mortality volume, when compared to estimates derived from the first 6 years of data collected under annual inventory methodology (Witt et al. 2012). While this increase in annual mortality appears large in absolute terms, it is relatively small; net annual growth (growth minus mortality) as a percentage of net volume of all live trees 5.0 inches and larger in diameter was 0.63 percent per year and has been averaging under 1 percent over the annual inventory (fig. 5). These data demonstrate that high mortality is shrinking gains from live-tree growth.

Gross growth and mortality varied considerably by major owner group (fig. 6). Gross growth of all trees on forest lands managed by the National Forest System exceeded mortality by a small margin, so that net annual growth was approximately 8.6 million cubic feet. Gross growth exceeded mortality by a much wider margin across private and State and local ownership groups where net annual growth was 204.3 and 97.9 million cubic feet, respectively (fig. 6).

Gross growth and mortality across stand-age classes showed at least three important patterns in Idaho (fig. 7). First, nonstocked (age class = 0) and very young stands (up to 20 years) have high negative net growth, -245.2 million cubic feet, due to high levels of mortality. This is expected because typically these stands represent areas that have recently experienced stand-replacing disturbance such as fire and bark beetle outbreaks, or timber harvesting activities. Second, the amount of mortality peaks again in the 101–120 year old age-class presumably due to a combination of self-thinning as stands age, non-stand-replacing disturbances such as endemic bark beetle populations, and low-severity fire. Finally, net growth is highest for younger stands in the 41–60 (133.8 MMCF), 61–80 (201.6 MMCF), and 81–100 (145.9 MMCF) year age-classes, as would be expected as trees mature in height and enter full site occupancy.

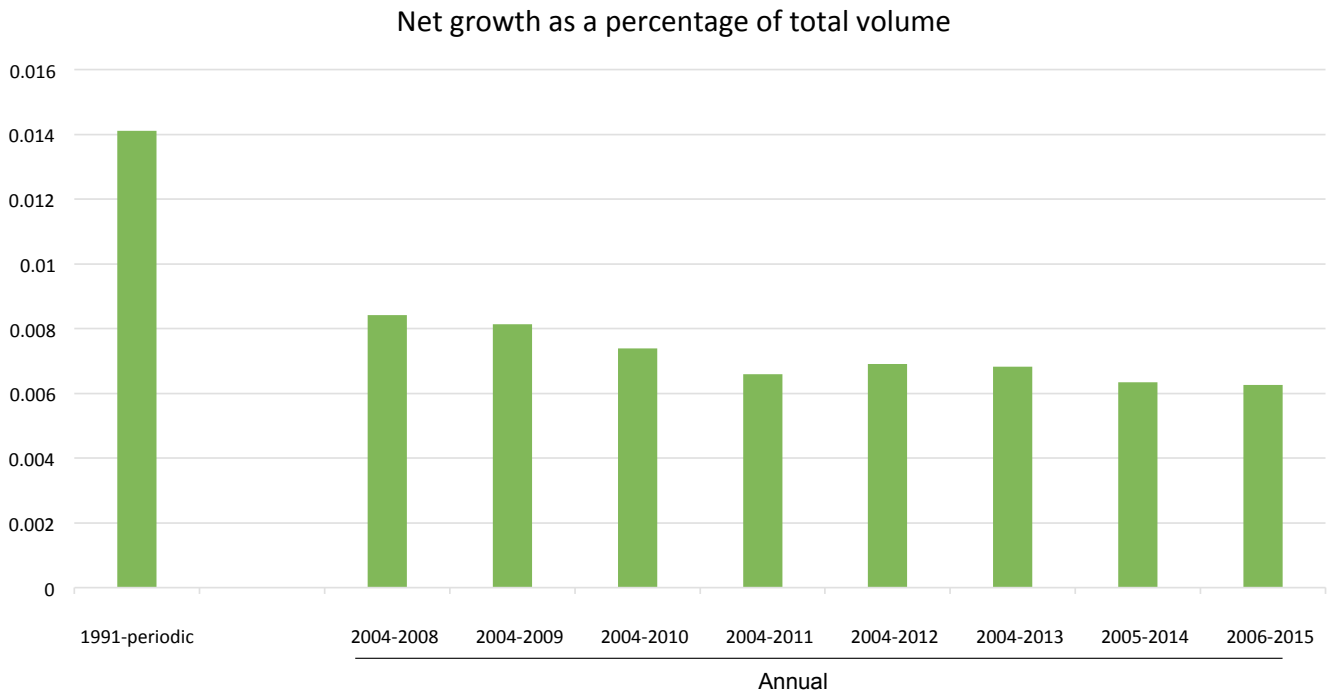

Figure 5—Net growth of all live trees (>5 inches diameter) as a percentage of total live volume (>5 inches diameter) for the State of Idaho for evaluation periods from 2004–2008 to current (2006–2015). Also included is the growth estimate from the last periodic inventory (1991). Although the annual and periodic inventories are not directly comparable, this estimate is included to show the likely magnitude of change in net growth from 1991 to the current inventory.

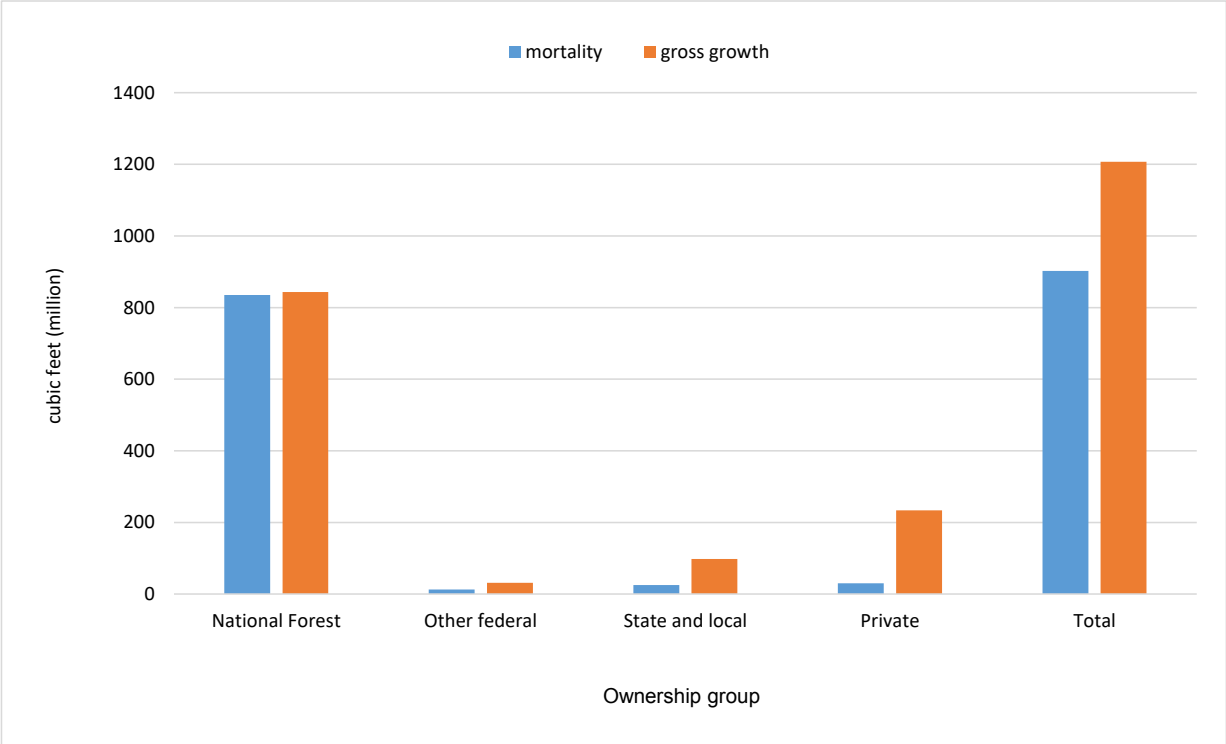

Figure 6—Gross annual growth and mortality by ownership group. Idaho, 2006–2015. Note: Net annual growth equals gross growth minus mortality.

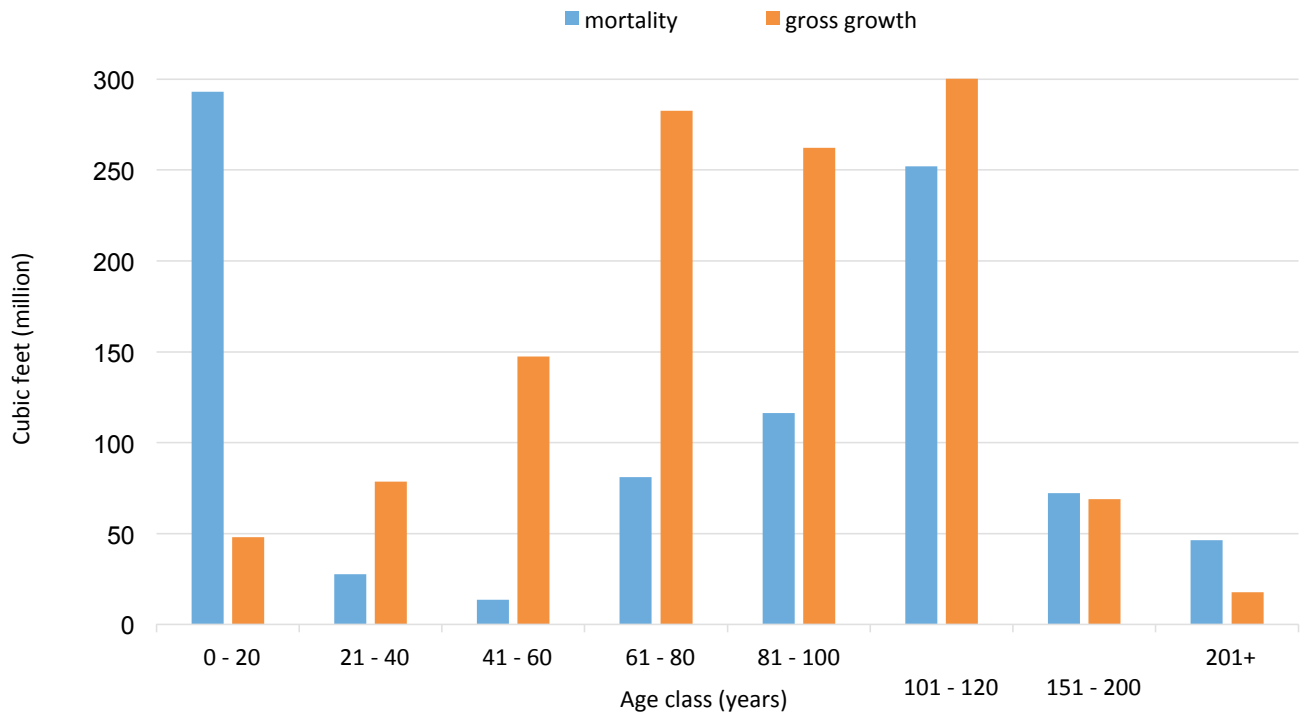

Figure 7—Gross annual growth and mortality by stand age class, Idaho, 2006–2015. Note: Net annual growth equals gross growth minus mortality.

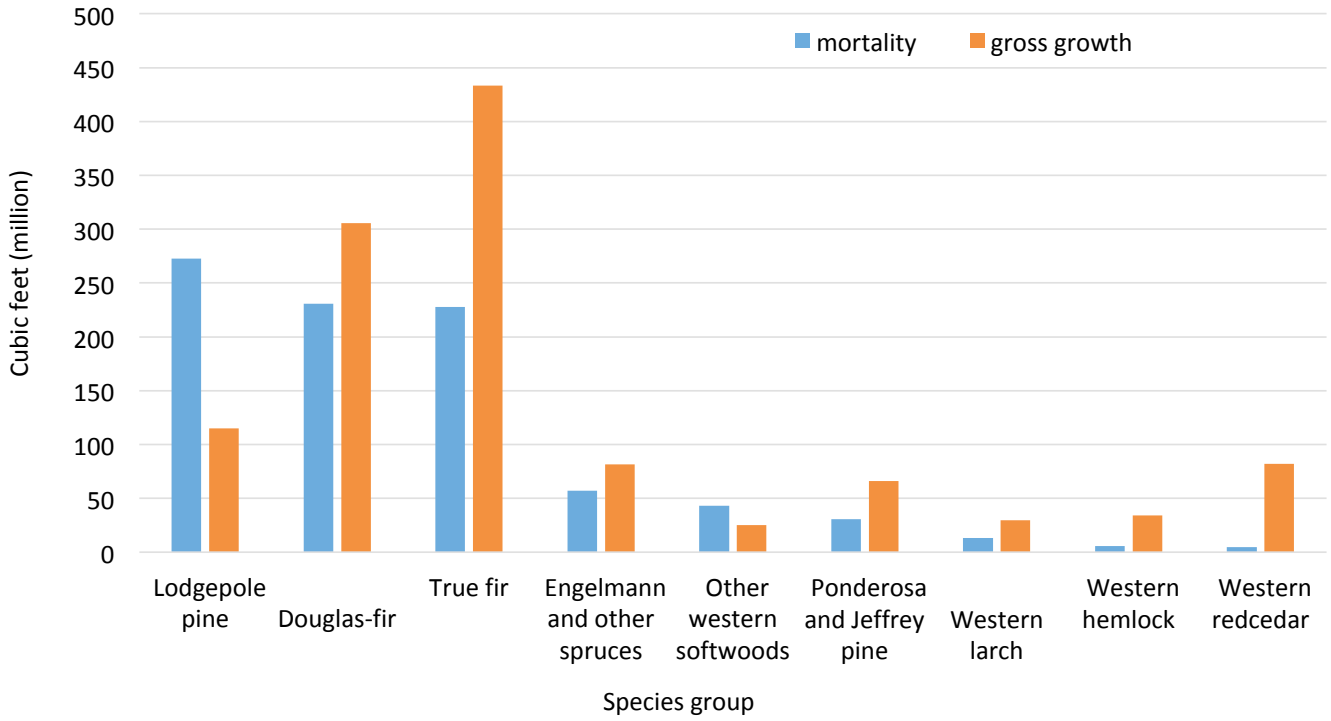

Figure 8—Gross annual growth and mortality for the nine most abundant species groups (by volume). Idaho, 2006–2015. Note: Net annual growth equals gross growth minus mortality.

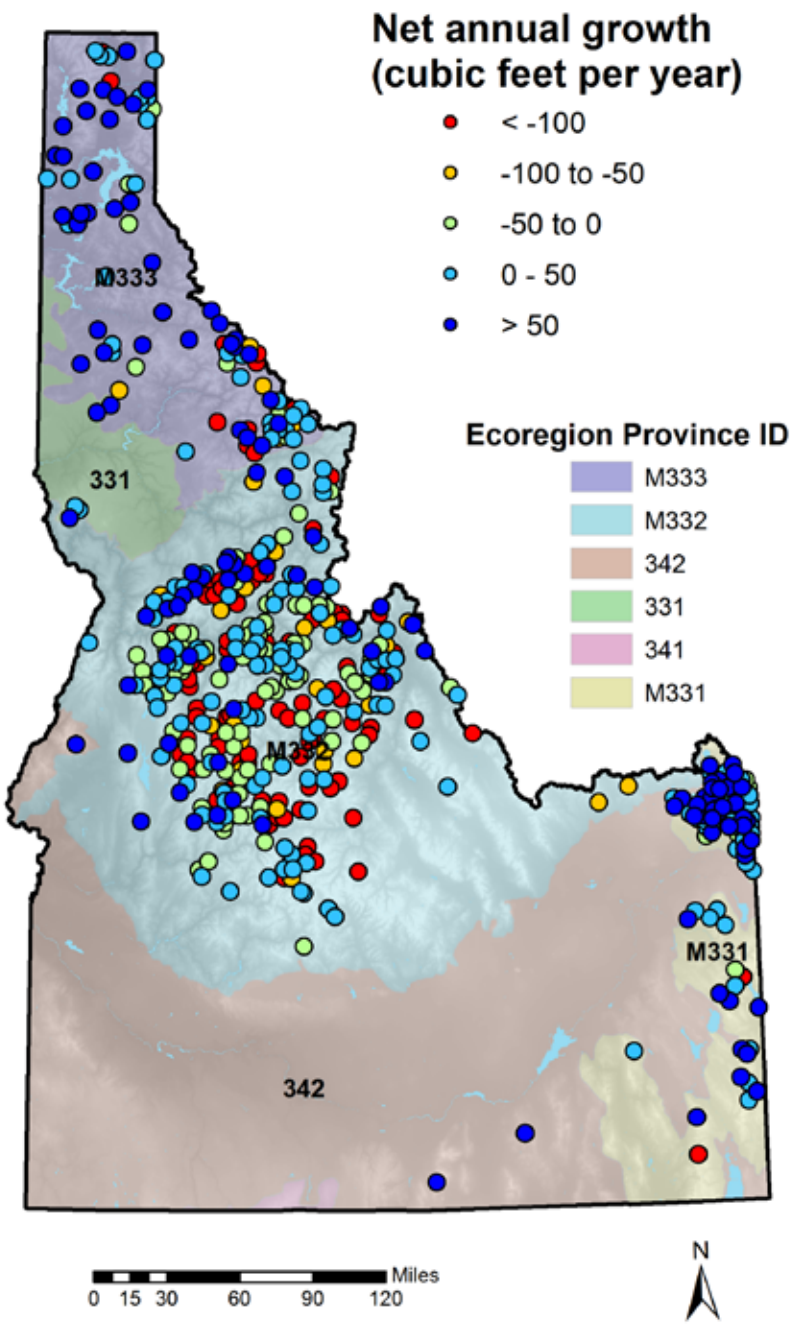

Figure 9—Net annual volume (million cubic feet per year) for the Lodgepole pine forest type in Idaho, 2006–2015. Ecoregions Provinces are: M333-Northern Rocky Mountain Forest-Steppe - Coniferous Forest - Alpine Meadow; M332-Middle Rocky Mountain Steppe - Coniferous Forest - Alpine Meadow; M331-Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow; 342-Intermountain Semi-Desert; 331-Great Plains - Palouse Dry Steppe, and; 341-Intermountain Semi-Desert and Desert.

Net growth by tree species group was positive except for the Lodgepole pine and Other western softwoods species groups (fig. 8). True fir, Western redcedar, Douglas-fir, and Ponderosa pine species groups had the highest ratios of gross growth to mortality and therefore had the highest net annual growth in the State at 205.6 MMCF, 77.4 MMCF, 74.7 MMCF, and 35.3 MMCF, respectively. In the case of the Lodgepole pine species group, where mortality exceeded gross growth resulting in negative net growth over the 2006–2015 time period, further inquiry into mortality causes and patterns is warranted. In the Lodgepole pine forest type, high levels of mortality occurred almost exclusively within the M332 ecoregion (Middle Rocky Mountain Steppe – Coniferous Forest – Alpine

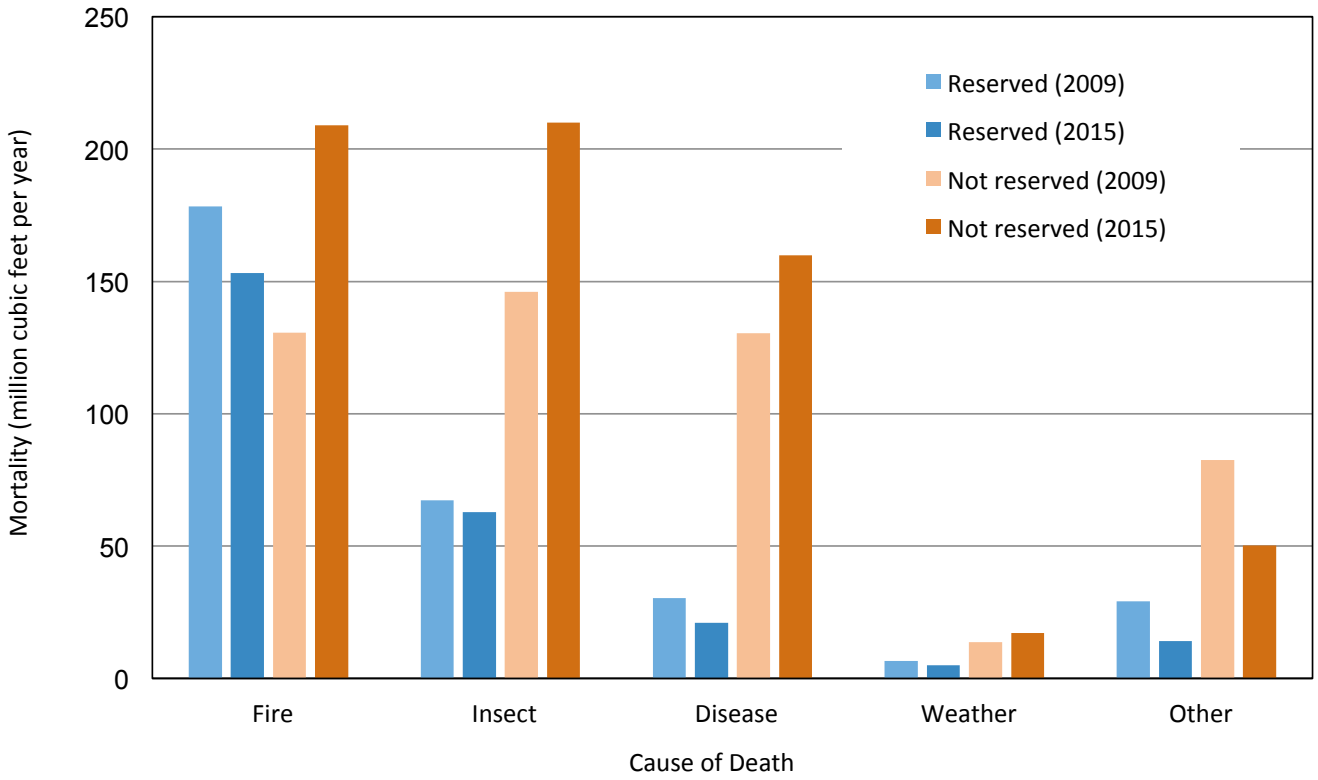

Figure 10—Average annual mortality of trees (cubic foot volume) by reserved status and cause of death. Idaho, 2006–2015.

Meadow Province) in the higher elevation central portion of the State (fig. 9). Interestingly, tree-level causes of death for lodgepole pine were split nearly evenly between fire and insects, 99.3 MMCF and 96.8 MMCF, respectively. It is possible that fire and beetle disturbances interacted to create some of this mortality. For some species of conifer, bark beetle populations can build in trees weakened by fire (Kelsey and Joseph 2003). Alternatively, it has been suggested that fire likelihood can be altered by beetle-killed fuels (Hicke et al. 2013).

By comparison, the leading causes of mortality across Idaho by volume affected were fire (40 percent of all mortality, 362.1 MMCF), insects (30 percent, 272.8 MMCF), and diseases (20 percent, 180.8 MMCF) (fig. 10). Unreserved forests exhibited much higher volumes of mortality than reserved forests, 72 percent versus 28 percent, respectively. The differences by cause of death were also variable; for example, the vast majority of both the disease- and insect-caused mortality occurred on unreserved land. Fifty-eight percent of fire-caused mortality occurred on unreserved land compared to 42 percent on reserved.

All trees classified as mortality trees are assigned a cause of death in the field. While drawing conclusions from mortality estimates by cause of death should be done with caution because the actual agent that caused a tree's death may be difficult, if not impossible, to determine. In the case of lodgepole pine it is reasonable to assume that a large percentage of the insect-caused mortality was due to recent mountain pine beetle activity, and by very large recent wildfires in the central portion of the State, which is dominated by lodgepole pine.

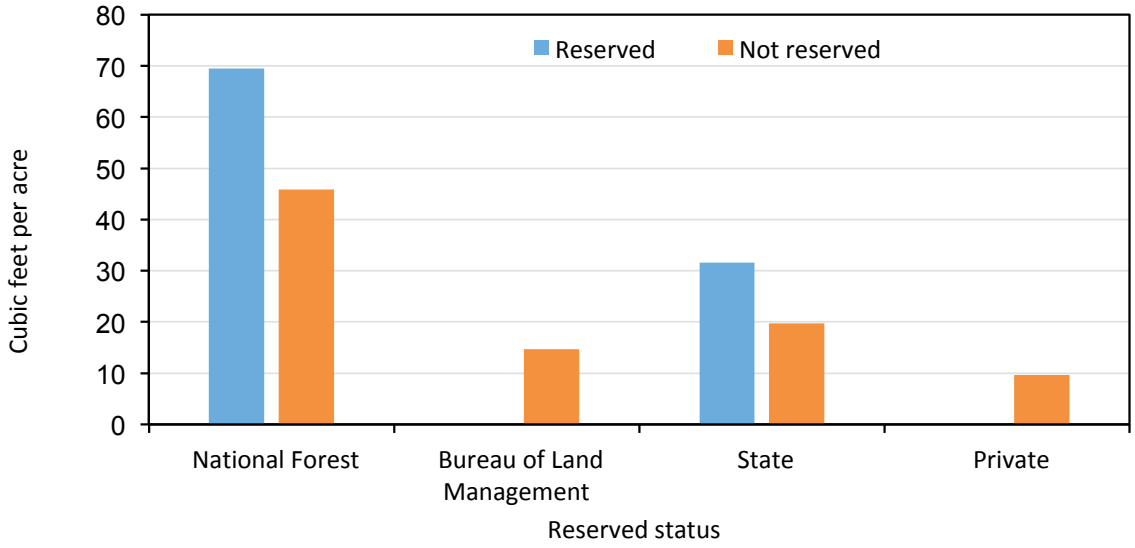

Figure 11—Average annual per-acre mortality on forest land by major owner categories and reserved status, Idaho, 2006–2015.

High mortality is the driver behind the difference between gross growth and net growth in Idaho. By converting the State-level estimates of mortality into per-acre estimates, the effect of differences in the amount of forest land administered by different ownership groups is removed. Across all ownerships, the Statewide per-acre estimate of annual mortality volume was 41.8 cubic feet per year. Mortality on all national forest lands was estimated at 51.2 cubic feet per acre, and it was over two times higher than on State lands, the ownership class with second-highest mortality volume on a per acre basis, at 19.9 cubic feet per acre. Private lands had lower annual mortality volume, 9.7 cubic feet per acre, than both State and Forest Service lands.

Differences in reserved status have also been observed in other State inventories (Menlove et al. 2012; Witt et al. 2012) and may suggest that National Forest System lands have a larger share of aging forest stands that are more susceptible to insect, disease, and fire, and may not be accessible for treatment. Indeed, a large portion of central Idaho is managed by NFS as Wilderness where stocking control is not an option, and in recent years there have been many large fires here. While reserved status lands on the State ownership had lower per-acre mortality than on national forest land, the pattern of reserved land having more mortality than land that is not reserved was similar (fig. 11). Lower mortality per acre on BLM, State, and private land indicates these landowners have the option of treating stands with high mortality.

Average annual mortality per acre also varied across the most predominant forest-type groups and ownership classes (fig. 12). Nonstocked lands, which have no species-derived forest type assigned to them, exhibited very high mortality on a per-acre basis. These plots occurred primarily on national forest lands; consisted primarily of Douglas-fir, Lodgepole pine, and True fir species groups; and had fire as the dominant cause of mortality. Western white pine

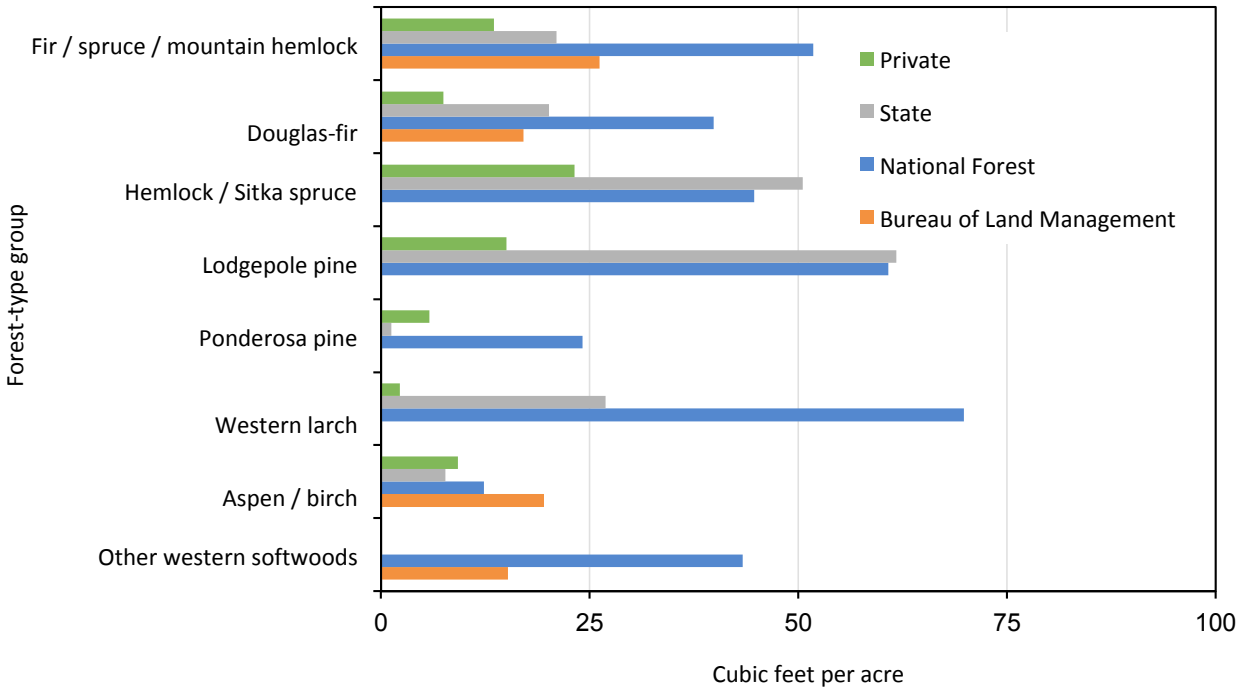

Figure 12—Average annual mortality in cubic feet per acre by ownership and forest-type group for the eight most prevalent forest-type groups (by volume), Idaho, 2006–2015.

forests exhibited the highest rate of mortality per acre on Forest Service lands; an average of 102.3 cubic feet per acre died per year over the inventory period.

Forest Pests, Pathogens, and Other Damage Agents

FIA crews record damage codes representing a wide range of biotic-, abiotic-, and human-caused damage agents if they are present on individual live trees. A single tree may be assigned up to three damage agents, in decreasing order of their impact on the tree. The protocol is based on a threshold system, where only trees with evidence of serious physical damage, insect infestation, or pathogen infection are assigned damage agent codes. Although this is somewhat subjective, the general rule is that damage should be recorded when it will cause at least one of the following:

1. Prevent the tree from living to maturity or surviving 10 more years if already mature.
2. Prevent the tree from producing marketable products.
3. Reduce (or has seriously reduced) the quality of the tree's products.

These rules roughly correspond to two main categories of damage agents. Agents that are likely to prevent a tree from living to maturity or surviving for 10 years after the inventory date tend to be those related to insects, disease, fire, and atmospheric effects (drought, flooding, wind, etc.), whereas agents that preclude or reduce a tree's merchantability are more likely to be problems with form, such as forks, broken tops, or bole scars. Trees with form-related damages may or may

Table 3—Distribution of primary damage agents by agent group for 2009 and 2015 Idaho inventories.

Damage agent group	2004–2009	2006–2015
None	72.1%	78.4%
Insects	1.3%	1.8%
Diseases	4.2%	4.5%
Fire	0.5%	0.7%
Animals	0.2%	0.3%
Abiotic	0.5%	0.5%
Competition	0.2%	0.3%
Human	0.2%	0.2%
Form/other	20.6%	13.4%

not be affected with respect to survival. Therefore, not all trees with damages recorded are expected to die, and some of those with poor merchantability may live to typical ages for their species. Damage agents are recorded only for live trees, in contrast to mortality agents, which are recorded only for trees that recently died. Up to three damage agents may be recorded for any live tree, although the vast majority of trees with a primary damage agent recorded do not have secondary or tertiary damage agents. Therefore, only primary damage agents are presented here.

Idaho's current inventory tallied 2.57 billion live trees 5 inches or greater in diameter, of which 22 percent, or 557,000 trees, had some damage agent recorded. This reflects about a 6 percent reduction from the previous inventory (table 3). Damage agents related to form or merchantability accounted for the majority of primary damage agents. Note that temporal discrepancies in thresholds for recording form-related damage agents account for much of the differences in total damage between the two inventories. Diseases were recorded for 5 percent of live trees in the current inventory, with dwarf mistletoe, cankers, and stem decay accounting for 77 percent of all diseases recorded on live trees (table 4). Insects were recorded as the primary damage agent for about 2 percent of trees, with defoliators being the most commonly found (44 percent of insect damage total). Insect damage was found predominantly in lodgepole pine (15.5 million trees) and Douglas-fir (15 million trees) as these two species make up 66 percent of all trees infected by insects. Interestingly, no insect damage was recorded on any woodland species during the inventory period. Each of the other primary damage agents affected less than 1 percent of all trees and, with the exception of the form/other agent group, no damage agent totals changed appreciably since the previous reporting period.

Whitebark Pine Status and Trends

Pinus albicaulis, or whitebark pine, is an iconic, high-elevation conifer that occurs throughout the northern Rocky Mountains to the Pacific Coast. It has a mutualistic relationship with the Clark's nutcracker (*Nucifraga columbiana*), which caches seeds in sites that are favorable for establishment (Hutchins and Lanner

Table 4—Number of trees (in millions) having a damage agent detected on them, by species and agent group. Blank values reflect zero values. Column and row totals may not sum correctly due to rounding. Idaho, 2006–2015.

	Damage agent group									
Timber species	**None**	**Insects**	**Diseases**	**Fire**	**Animals**	**Abiotic**	**Competition**	**Human**	**Form/ Other**	**All agents**
Grand fir	291.5	2.5	13.8	1.9	0.3	3.8	1.3	1.2	30.0	346.3
Subalpine fir	290.3	9.1	8.1	1.9	1.5	2.8	0.9	< 0.1	53.0	367.5
Western juniper	16.9		0.9	< 0.1		< 0.1	< 0.1		2.0	19.9
Subalpine larch			< 0.1							< 0.1
Western larch	44.8	0.2	2.1	0.1	0.2	0.1		0.3	3.8	51.6
Engelmann spruce	114.5	1.3	2.3	0.5	0.8	0.4	0.6	< 0.1	12.1	132.5
Whitebark pine	25.8	2.0	2.7	0.3	0.3	0.5	0.1	0.1	13.3	45.1
Lodgepole pine	335.4	15.5	32.6	2.2	1.1	1.5	0.9	0.3	78.7	468.1
Limber pine	4.2	0.1	0.9				< 0.1		3.3	8.5
Western white pine	11.6	< 0.1	2.7		0.1	< 0.1		0.1	1.3	15.9
Ponderosa pine	75.7	0.3	1.9	1.8	0.1	0.1	0.1	0.5	15.7	96.2
Douglas-fir	472.0	15.0	28.4	8.8	1.5	1.1	1.8	1.2	95.2	625.0
Pacific yew	449.1		0.1						0.3	449.5
Western redcedar	116.7	0.1	6.3	0.3	0.5	0.3	0.1	0.7	13.3	138.3
Western hemlock	53.8	< 0.1	2.9		0.2	0.3	0.1	0.1	4.6	62.1
Mountain hemlock	41.7		0.7		< 0.1	0.2	0.1		4.2	47.0
Red alder	0.6		0.1						0.1	0.8
Water birch	0.4								0.1	0.5
Paper birch	10.0		< 0.1			0.1	< 0.1		2.2	12.4
Quaking aspen	36.0	0.4	8.8	0.1	0.1	0.3	< 0.1		8.1	53.8
Black cottonwood	1.9		0.1						0.4	2.5
Narrowleaf cottonwood	0.2		< 0.1						1.0	1.2
Timber species totals	2,393.1	46.6	115.4	17.8	6.6	11.6	6.3	4.6	342.7	2,944.6

Woodland species	**None**	**Insects**	**Diseases**	**Fire**	**Animals**	**Abiotic**	**Competition**	**Human**	**Form/ Other**	**All agents**
curlleaf mountain-mahogany	27.2		0.2	0.0	0.2	0.1	0.5		1.5	29.7
bigtooth maple	10.9								0.6	11.5
singleleaf pinyon	0.6									0.6
Utah juniper	24.7		0.3	0.1	< 0.1	0.1		0.1	0.3	25.6
Rocky Mountain juniper	7.7		0.2						0.2	8.1
Woodland species totals	71.0	0.0	0.7	0.2	0.2	0.2	0.5	0.1	2.7	75.5

1982), and provides food for numerous other wildlife species including red squirrels and grizzly bears. Due to recent declines caused by a combination of factors, including mountain pine beetle, changing fire regimes, white pine blister rust, et al. (Keane et al. 2012; Raffa et al. 2008), the U.S. Fish and Wildlife Service considered protecting whitebark pine under the Endangered Species Act (USFWS 2011) but did not list it due to the agency's limited budget for adding species to the protected lists.

To illuminate broad-scale status and trends in whitebark pine populations in Idaho, several attributes of whitebark pine were estimated at a Statewide level and then compared among forest types and ownership groups. Compared attributes included forest land area with a whitebark pine component; size-class distribution of live and dead trees; mean annual growth; and mean annual mortality. Due to high recent mortality of whitebark pine trees, the causal agents of mortality and damage to live trees were summarized as well.

The estimates reported here were produced using the EVALIDatorPC tool, which is available from the FIA DataMart (USDA FS 2016). EVALIDatorPC does not constrain estimates of forest land area to the presence of an individual tree species. To calculate density attributes such as trees per acre, which are referred

Table 5—Area (acres) represented by plots with a whitebark pine component, by forest type. Percent standard errors are shown in italics.

Forest type	Area (acres)	Standard error (%)
Douglas-fir	419,840	*-11.5*
Engelmann spruce	34,411	*-41.6*
Engelmann spruce / subalpine fir	345,583	*-12.9*
Subalpine fir	732,763	*-8.7*
Mountain hemlock	12,373	*-70.7*
Lodgepole pine	404,408	*-12.2*
Limber pine	12,391	*-71.3*
Whitebark pine	242,387	*-15.3*
Aspen	7,471	*-82.8*
Nonstocked	191,979	*-17.4*
Total	2,403,605	*-4.5*

to as ratio estimates, custom queries were used within EVALIDatorPC to estimate the area of forest land with a whitebark pine component. Thus, the denominator in our ratio estimates consisted of the area of forest land with a whitebark pine component rather than total forest land area. Conditions with a "whitebark pine component" are those having at least one whitebark pine tree that meets at least one of the following conditions: live and at least 1.0 inch d.b.h.; dead and at least 5.0 inches d.b.h.; or live and less than 1.0 inch d.b.h. but at least 6 inches tall (i.e., a seedling). The data quality control for this procedure consisted of comparing two estimates of forest land area: (1) a customized estimate of forest land area within the whitebark pine forest type and having a whitebark pine component within the whitebark pine forest type, and (2) the standard EVALIDatorPC estimate of forest land area within the whitebark pine forest type. The two estimates were identical to 9 significant digits.

There were 359 forested plots measured between 2006 and 2015 that had a whitebark pine component. Only 33 plots with a whitebark pine component, or 9 percent, fell in stands classified as whitebark pine forest type. Of the remaining 326 plots, about 36 percent occurred in the Subalpine fir forest type, 18 percent occurred in the Lodgepole pine forest type, 17 percent occurred in the Douglas-fir forest type, and another 17 percent occurred in the Engelmann spruce/subalpine fir forest type. The vast majority of plots with a whitebark pine component occurred on National Forest System (NFS) lands (98 percent, or 351 plots). Five plots occurred on Bureau of Land Management (BLM) lands, two on other Federal lands, and one on private land.

The whitebark pine forest type covers 242,558 acres in Idaho, and forests with a whitebark pine component cover almost 2.1 million acres (table 5). However, the density of whitebark pine trees varies across this acreage. Therefore, the number and density of live and dead whitebark pine trees were compared across forest types. Density was calculated as the number of trees in a particular category divided by the area of forest land with a whitebark pine component in that category

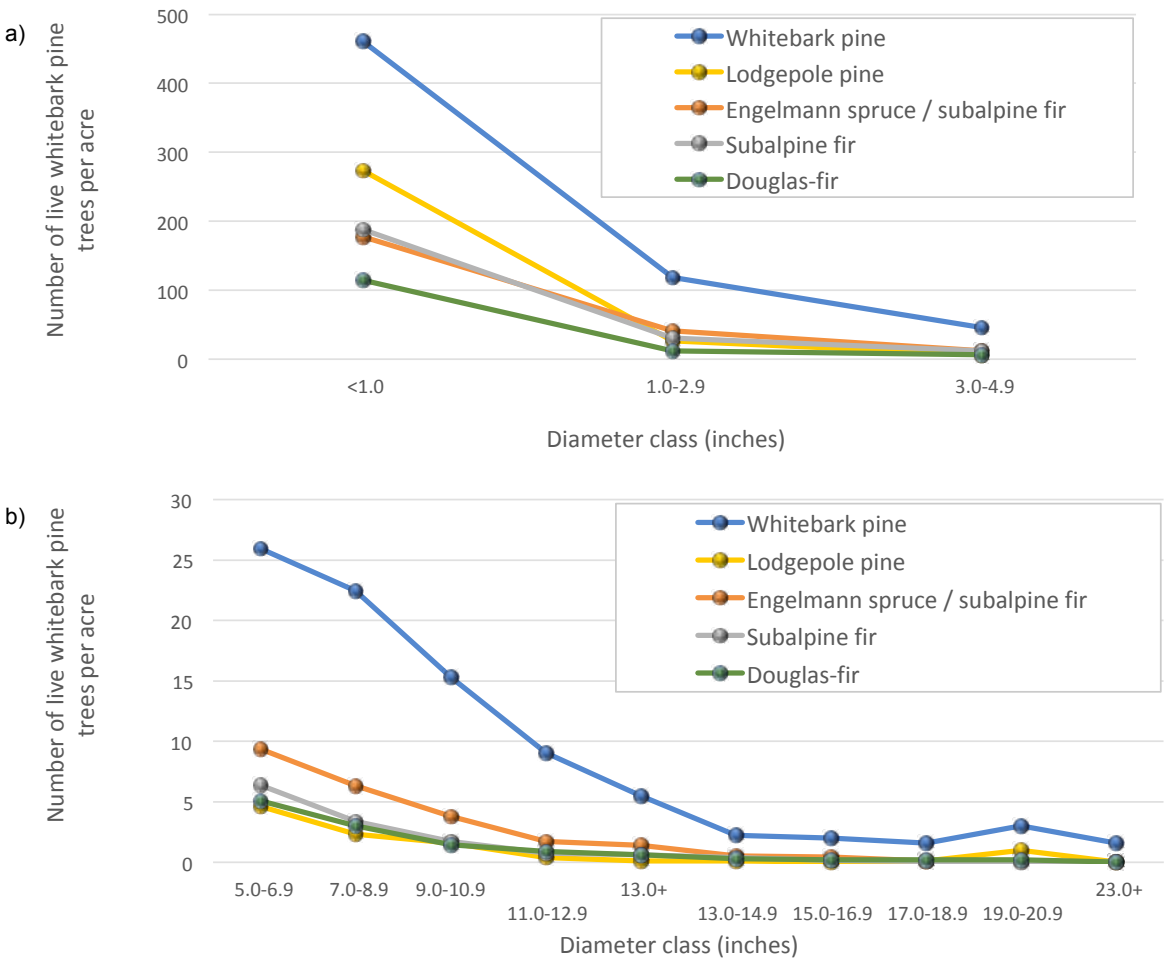

Figure 13—Mean density of live whitebark pine trees (number of trees per acre) by forest type (types shown in legend), as measured for trees less than 5.0 inches d.b.h. (a) and those 5.0 inches or larger (b).

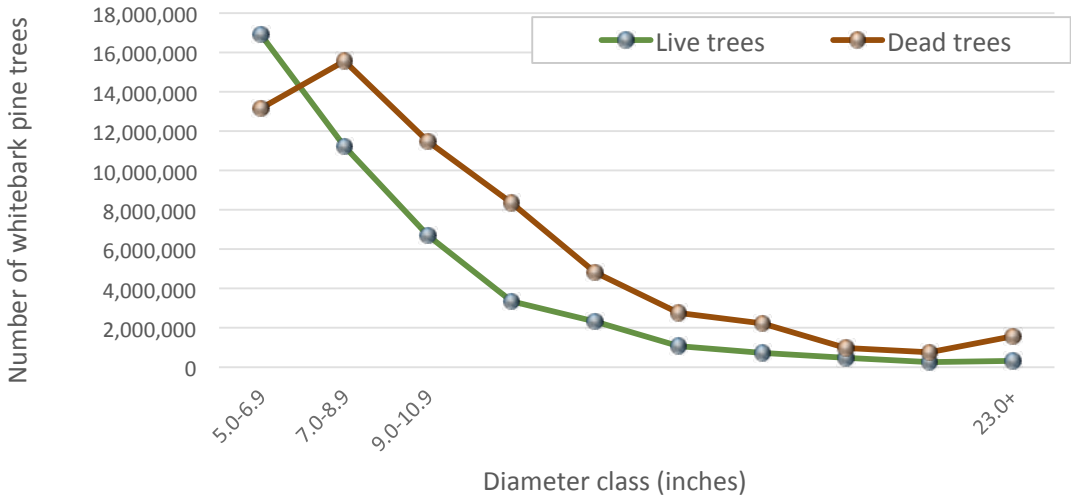

Figure 14—Total number of live and dead whitebark pine trees at least 5.0 inches d.b.h. Data are based on measurements from 359 plots Statewide.

(e.g., the number of whitebark pines in the Subalpine fir forest type divided by the total area of subalpine fir forest type with a whitebark pine component). The number of trees per acre of all size classes of whitebark pine is greatest within the whitebark pine forest type in Idaho (fig. 13). This result has not been observed everywhere; for example, the density of whitebark pine seedlings in Wyoming is highest in the Lodgepole pine forest type (DeRose et al., in press).

The total number of live and dead whitebark pines was compared by size class (fig. 14). Throughout Idaho, there are more live than dead whitebark pines in the smallest size class (5.0–6.9 inches d.b.h.), and more dead than live whitebark pines in size classes above 7.0 inches. There is a total of more than 43 million live trees at least 5.0 inches d.b.h., and nearly 62 million dead whitebark pines at least 5.0 inches d.b.h., in Idaho. There are also almost 99 million live whitebark pines smaller than 5.0 inches d.b.h.

One way to assess the overall trend within a tree population is to compare rates of mean annual growth and mortality. FIA quantifies growth and mortality in terms of the volume that was added by live trees and the volume lost in the form of trees that recently died. Whitebark pines in Idaho experienced mean annual gross growth of 671,000 cubic feet per year, compared to more than 6.8 million cubic feet per year of mortality. Thus, Idaho's whitebark pines have experienced a net loss of almost 6.2 million cubic feet per year. This is equivalent to about 3 cubic feet per acre per year, given that there are nearly 2.1 million acres in Idaho with a whitebark pine component (table 5). Negative net growth indicates that mortality rates are higher than gross growth rates on a volumetric basis, and because declines in mature-tree volume are not offset by regeneration for many years, further decline may continue to be observed in the coming years.

The frequency of mortality-causing agents for all whitebark pine trees that recently died (table 6) were compared to examine the causes of tree death. Out of a total of 601 trees that died no more than 5 years prior to measurement, 286 were determined to have been attacked by insects. Other important mortality agents were fire (233 trees) and disease (47 trees), which was primarily rust. To illuminate the extent to which these mortality agents continue to affect live trees in Idaho,

Table 6—Number of whitebark pine trees that were estimated to have died no more than 5 years prior to measurement on 359 FIA plots, by causal mortality agent and forest type.

	Mortality agent				
Forest type	**Insects**	**Disease**	**Fire**	**Other[a]**	**Total by forest type**
Douglas-fir	47	2	15	8	**72**
Engelmann spruce/subalpine fir	39	3		10	**52**
Subalpine fir	100	15	33	9	**157**
Mountain hemlock				1	**1**
Lodgepole pine	25	9	34	2	**70**
Limber pine	3			3	
Whitebark pine	60	16	81	2	**159**
Nonstocked	12	2	70	0	
Total by causal agent	**286**	**47**	**233**	**35**	**601**

[a]Includes weather, competition/suppression, and unknown causes.

Table 7—Number of live whitebark pine trees on 359 FIA plots, by damaging agent and forest type. Damaging agents that were recorded on less than 30 trees are not shown. Insects were primarily bark beetles. Disease was primarily rust. Causes of dead or broken tops were unknown. Form defects include crooks and forks in the bole.

	Damaging agent							
Forest type	No damage	Insects	Rust and other diseases	Dead or broken top	Form defect	Open wound	Other damages	Total by forest type
Douglas-fir	85	4	5	8	10	9	9	130
Engelmann spruce	5	0	1	4	0		0	10
Engelmann spruce / subalpine fir	167	16	7	17	36	12	3	258
Subalpine fir	235	7	21	20	22	13	6	325
Lodgepole pine	88	1	13	16	3	5	1	127
Limber pine	0	0	1	0	0		0	1
Whitebark pine	290	28	25	24	82	22	20	492
Aspen	0	0	0	0	2		0	2
Nonstocked	23	0	7	2	0		4	36
Total by damaging agent	**893**	**56**	**80**	**91**	**155**	**61**	**36**	**1381**

damaging agents recorded on live trees were also compared. Damaging agents are recorded on live trees that are not expected to survive insects, disease, or other factors (table 7) until the next measurement, which would normally occur 10 years later. Of the 1,381 live whitebark pine trees that were measured on 359 plots in Idaho, 488 (35.3 percent) had one or more damages recorded. Less than 10 percent of live trees showed evidence of insects or disease. This may indicate that the high recent mortality of whitebark pine was episodic rather than constant. However, a common mortality-causing disease—white pine blister rust—is not evident at the early stages of infection and can take many years to kill a tree. As a result, FIA data almost certainly underestimate the prevalence of rust. Future remeasurement of these plots will help clarify the ongoing rate and direction of trends in growth and mortality.

Net growth, or gross growth minus mortality, is currently negative among all size classes of whitebark pine (fig. 15). Gross growth is greatest in the smallest size classes, and larger diameter classes show increasingly lower growth. Mortality is also lowest in the smallest size class (5.0–6.9 inches d.b.h.), which reinforces previous studies showing that both blister rust and mountain pine beetle differentially

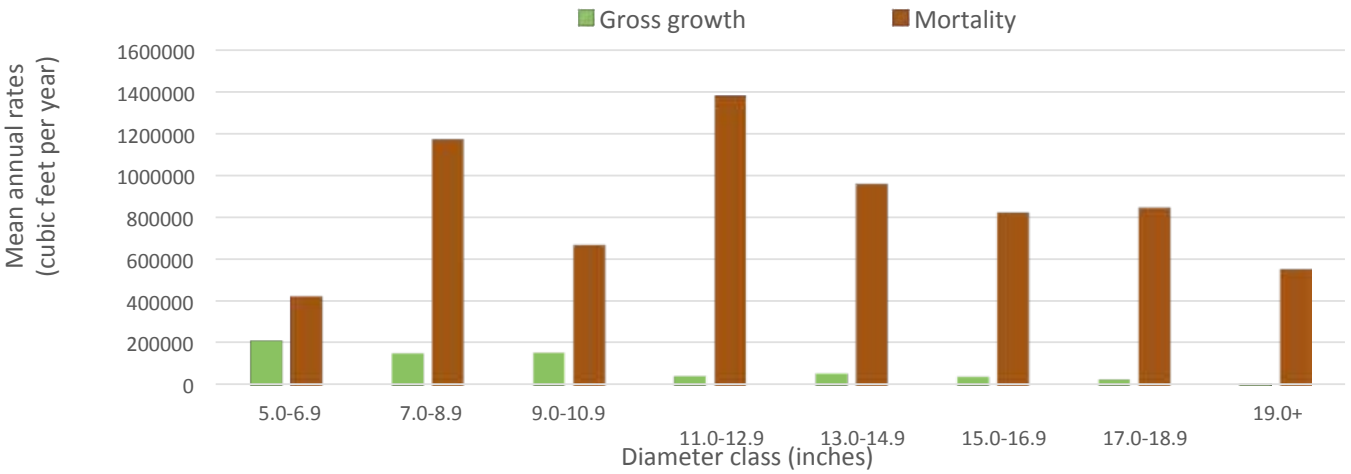

Figure 15—Mean annual gross growth and mortality of whitebark trees at least 5.0 inches d.b.h.

affect larger size classes (Field et al. 2012; Meyer et al. 2016). However, net growth is still negative in the 5.0–6.9 inch size class due to mortality that exceeds gross growth.

A recent evaluation of the relative impacts of mountain pine beetle and white pine blister rust on whitebark pine population growth found that areas without mountain pine beetle had positive growth in terms of numbers of stems, even when blister rust was present (Jules et al. 2016; note that this study monitored rust presence more frequently than is done on FIA plots and thus was less likely to underestimate rust prevalence). Therefore, if the recent mountain pine beetle epidemic is episodic and beetle populations return to endemic levels, it is possible that the dramatic declines observed thus far may slow or eventually cease. However, it is possible that the mortality up to this point has diminished the ability of whitebark pine to reproduce sufficient cones, and future population viability may be determined more by survival of seedlings and small trees (McCaughey et al. 2009). FIA will continue to collect remeasurement data and evaluate the fates of previously measured trees, which will allow us to answer questions about future survival, growth, and regeneration of whitebark pines in Idaho.

Conclusions

Idaho has a wide variety of forest types, structure, and species assemblages that make up almost the 21.6 million forested acres in the State. The large majority of Idaho's forests (76 percent) are administered by Federal agencies such as the USDA Forest Service while most of the remaining acreage is privately owned and managed. Federal agencies manage 3.7 million acres of reserved forests in Idaho and as such, provide opportunities for non-consumptive uses such as recreation, wildlife habitat, carbon sequestration, air and water quality, view shed preservation, as well as traditional cultural uses. The remaining 18 million acres under Federal management are unreserved and cater to some of the same uses as reserved forest but also facilitate the development and maintenance of roads and trails, campgrounds, ski hills, and mineral and timber extraction, reflecting these agencies' multiple use mandate.

During the current inventory period, tree mortality in Idaho has exceeded growth for three important timber species groups: the true firs, Douglas-fir, and lodgepole pine. While insects appear to be the main source of tree damage in Idaho's forests, fire has been the main source of mortality (59 percent of total). Another particular species of interest incurring high mortality is the whitebark pine. This iconic western species has been impacted by fire, disease, and insect attack to the point that dead trees now outnumber live ones in all but the smallest size classes. These remaining small whitebark pine trees most often occur as a component of other forest types rather than as a part of whitebark pine stands, adding a confounding factor to recovery plans for this species in Idaho.

The systematic interpenetrating panel design of the FIA annual inventory presents opportunities to assess trends in inventory estimates never before possible

with previous periodic inventories. Therefore, the information presented in this report serves as a baseline and might indicate opportunities for further analysis, investigation, or study. Quantitative inferences about temporal trends require consideration of independent estimates of the population status each year, each of which uses completely different sample plots from different panels. These estimators can be used to track mortality events, lead to better monitoring of forest growth, and track tree harvest activity. As the annual inventory effort extends into the second measurement cycle in Idaho, the power to detect trends and significant effects related to growth, mortality, removals, and other parameters of interest will be realized as estimates can be derived from remeasurement of previously measured plots that will be available. In this way, the FIA program fills the need for accurate and consistent, long-term monitoring procedures and data that analysts, managers, and researchers can rely on to monitor and study forest attributes and their dynamics over time.

References

Bechtold, W.A.; Patterson, P.L., eds. 2005. The enhanced Forest Inventory and Analysis program—National sampling design and estimation procedures. Gen. Tech. Rep. SRS-GTR-80. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 85 p.

Benson, R.E.; Green, A.W.; Van Hooser, D.D. 1987. Idaho's forest resources. Resour. Bull. INT-RB-39. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 114 p.

Brown, M.J.; Chojnacky, D.C. 1996. Idaho's Forests, 1991. Resour. Bull. INT-RB-88. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 63 p.

DeRose, R.J.; Shaw, J.D.; Goeking, S.A.; [et al.]. [In press]. Wyoming's forest resources, 2011–2015. Resour. Bull. RMRS-RB-28. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 135 p.

Field, S.G.; Schoettle, A.W.; Klutsch, J.G.; [et al.]. 2012. Demographic projection of high-elevation white pines infected with white pine blister rust: A nonlinear disease model. Ecological Applications. 22(1): 166–183.

Gillespie, A.J.R. 1999. Rationale for a national annual forest inventory program. Journal of Forestry 97(12): 16–20.

Goeking, S.A.; Patterson, P.L. 2013. Stratifying to reduce bias caused by high nonresponse rates: A case study from New Mexico's forest inventory. Res. Note RMRS-RN-59. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 22 p.

Hicke, J.A.; Johnson, M.C.; Hayes, J.L.; [et al.]. 2012. Effects of bark beetle-caused tree mortality on wildfire. Forest Ecology and Management. 271: 81–90.

Hutchins, H.E.; Lanner, R.M. 1982. The central role of Clark's nutcracker in the dispersal and establishment of whitebark pine. Oecologia. 55: 192–201.

Jules, E.S.; Jackson, J.I.; van Mantgem, P.J.; [et al.]. 2016. The relative contributions of disease and insects in the decline of a long-lived tree: A stochastic demographic model of whitebark pine (*Pinus albicaulis*). Forest Ecology and Management. 81: 144–156.

Keane, R.E.; Tomback, D.F.; Aubry, C.A.; [et al.]. 2012. A range-wide restoration strategy for whitebark pine (*Pinus albicaulis*). Gen. Tech. Rep. RMRS-GTR-279. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 108 p.

Keegan, C.E.; Morgan, T.A.; Gebert, K.M.; [et al.]. 2006. Timber-processing capacity and capabilities in the western United States. Journal of Forestry. 104 (5): 262–268.

Keegan, C.E.; Sorenson, C.B.; Morgan, T.A.; [et al.]. 2012. Impact of the Great Recession and housing collapse on the forest products industry in the western United States. Forest Products Journal. 61(8): 625–634.

Kelsey, R.G.; Joseph, G. 2003. Ethanol in ponderosa pine as an indicator of physiological injury from fire and its relationship to secondary beetles. Canadian Journal of Forest Research. 33: 870–884.

McCaughey, W.W.; Scott, G.L. Scott; Izlar, D.K. 2009. Whitebark pine planting guidelines. Western Journal of Applied Forestry. 24(3): 163–166.

Menlove, Jim; Shaw, John D.; Thompson, Michael T.; [et al.]. 2012. Montana's forest resources, 2003–2009. Resour. Bull. RMRS-RB-15. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 140 p.

Meyer, M.D.; Bulaon, B.; MacKenzie, M.; [et al.]. 2016. Mortality, structure, and regeneration in whitebark pine stands impacted by mountain pine beetle in the southern Sierra Nevada. Canadian Journal of Forest Research. 46: 572–581.

Morgan, T.A.; Dillon, T.; Keegan, C.E., III; [et al.]. 2006. Four Corners timber harvest and forest products industry, 2002. Resour. Bull. RMRS-RB-7. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 64 p.

O'Connell, Barbara M.; Conkling, Barbara L.; Wilson, Andrea M.; [et al.]. 2017. The Forest Inventory and Analysis Database: Database description and user guide version 7.0 for Phase 2. U.S. Department of Agriculture, Forest Service. 830 p. http://www.fia.fs.fed.us/library/database-documentation/.

Raffa, K.F.; Aukema, B.H.; Bentz, B.J.; [et al.]. 2008. Cross-scale drivers of natural disturbances prone to anthropogenic amplification: The dynamics of bark beetle eruptions. Bioscience. 58(6): 501–517.

Simmons, E.A.; Hayes, S.W.; Morgan, T.A.; [et al.]. 2014. Idaho's forest products industry and timber harvest, 2011. Resour. Bull RMRS-RB-19. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 46 p.

USDA Forest Service [USDA FS] 2016. Forest Inventory and Analysis Database, St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northern Research Station. [Available only on internet: http://apps.fs.fed.us/fiadb-downloads/datamart.html] Last accessed Dec. 22, 2016.

U.S. Fish and Wildlife Service. 2011. Endangered and threatened wildlife and plants: 12-month finding on a petition to list *Pinus albicaulis* as endangered or threatened with critical habitat. Federal Register. 76(138): 42631–42654.

U.S. Department of Commerce, Bureau of Economic Analysis. 2013. Regional Economic Information System table. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&arcdn=4#reqid=70&step=1&isuri=1.

Witt, Chris; Shaw, John D.; Thompson, Michael T.; [et al.]. 2012. Idaho's forest resources, 2004–2009. Resour. Bull. RMRS-RB-14. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 134 p.

Woudenberg, S.W.; Conkling, B.L.; O'Connell, B.M.; [et al.]. 2010. The Forest Inventory and Analysis Database: Database description and users manual version 4.0 for Phase 2. Gen. Tech. Rep. RMRS-GTR- 245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 339 p.

Appendix A. Standard Forest Inventory and Analysis Terminology

Note: For the FIA national glossary please go to http://socrates.lv-hrc.nevada.edu/fia/ab/issues/pending/glossary.html.

Average annual mortality—The average annual volume of trees 5.0 inches d.b.h./d.r.c. and larger that died from natural causes.

Average annual net growth—Average annual net change in volume of trees 5.0 inches d.b.h./d.r.c. and larger in the absence of cutting (average annual gross growth minus average annual mortality).

Basal area (BA)—The cross-sectional area of a tree stem/bole (trunk) at the point where diameter is measured, inclusive of bark. BA is calculated for trees 1.0 inch and larger in diameter and is expressed in square feet. For timber species, the calculation is based on diameter at breast height (d.b.h.); for woodland species, it is based on diameter at root collar (d.r.c.).

Biomass—The quantity of wood fiber, for trees 1.0 inch d.b.h./d.r.c. and larger, expressed in terms of oven-dry weight. It includes above-ground portions of trees: bole/stem (trunk), bark, and branches. Biomass estimates can be computed for live and/or dead trees.

Board-foot volume—A unit of measure indicating the amount of wood contained in an unfinished board 1 foot wide, 1 foot long, and 1 inch thick**.** Board-foot volume is computed for the sawlog portion of a sawtimber-size tree; the sawlog portion includes the part of the bole on sawtimber-size tree from a 1-foot stump to a minimum sawlog top of 7 inches diameter outside bark (d.o.b.) for softwoods, or 9 inches d.o.b. for hardwoods. **Net board-foot volume** is calculated as the gross board-foot volume in the sawlog portion of a sawtimber-size tree, less deductions for cull (note: board-foot cull deductions are limited to rotten/missing material and form defect—referred to as the **merchantability factor—board-foot**). Board-foot volume estimates are computed in both Scribner and International ¼-inch rule, and it can be calculated for live and/or dead (standing or down) trees.

Census water—Streams, sloughs, estuaries, canals, and other moving bodies of water 200 feet wide and greater, and lakes, reservoirs, ponds, and other permanent bodies of water 4.5 acres in area and greater.

Coarse woody debris—Down pieces of wood leaning more than 45 degrees from vertical with a diameter of at least 3.0 inches and a length of at least 3.0 feet.

Condition class—The combination of discrete landscape and forest attributers that identify, define, and stratify the area associated with a plot. Such attributes include reserved status, owner group, forest type, stand-size class, stand origin, and tree density.

Crown class—A classification of trees based on dominance in relation to adjacent trees in the stand as indicated by crown development and amount of sunlight received from above and the sides.

Crown cover (Canopy cover)—The percentage of the ground surface area covered by a vertical projection of plant crowns. Tree crown cover for a sample site includes the combined cover of timber and woodland trees 1.0 inch d.b.h./d.r.c. and larger. Maximum crown cover for a site is 100 percent; overlapping cover is not double counted.

Cubic-foot volume (merchantable)—A unit of measure indicating the amount of wood contained in a cube 1 by 1 by 1 foot. Cubic-foot volume is computed for the merchantable portion of timber and woodland species; the merchantable portion for timber species includes that part of a bole from a 1-foot stump to a minimum 4-inch top d.o.b, or above the place(s) of diameter measurement for any woodland tree with a single 5.0-inch stem or larger or a cumulative (calculated) d.r.c. of at least 5.0 inches to the 1.5-inch ends of all branches. **Net cubic-foot volume** is calculated as the gross cubic-foot volume in the merchantable portion of a tree, less deductions for cull.

Diameter at breast height (d.b.h.) —The diameter of a tree bole/stem (trunk) measured at breast height (4.5 feet above ground), measured outside the bark. The point of diameter measurement may vary for abnormally formed trees.

Diameter at root collar (d.r.c.)—The diameter of a tree stem(s) measured at root collar or at the point nearest the ground line (whichever is higher) that represents the basal area of the tree, measured outside the bark. For multi-stemmed trees, d.r.c. is calculated from an equation that incorporates the individual stem diameter measurements. The point of diameter measurement may vary for woodland trees with stems that are abnormally formed. With the exception of seedlings, woodland stems qualifying for measurement must be at least 1.0 inch in diameter or larger and at least 1.0 foot in length.

Diameter class—A grouping of tree diameters (d.b.h. or d.r.c.) into classes of a specified range. For some diameter classes, the number referenced (e.g., 4”, 6”, 8”) is designated as the midpoint of an individual class range. For example, if 2-inch classes are specified (the range for an individual class) and even numbers are referenced, the 6-inch class would include trees 5.0 to 6.9 inches in diameter.

Diameter outside bark (d.o.b.)—Tree diameter measurement inclusive of the outside perimeter of the tree bark. The d.o.b. measurement may be taken at various points on a tree (e.g., breast height, tree top) or log, and is sometimes estimated.

Field plot/field location—A reference to the sample site or plot; an area containing the field location center and all sample points. A field location consists of four subplots and four microplots.

- **Subplot—**A 1/24-acre fixed-radius area (24-foot horizontal radius) used to sample trees 5.0 inches d.b.h./d.r.c. and larger and understory vegetation.

- **Microplot—**A 1/300-acre fixed-radius plot (6.8-foot radius), located 12 feet from the center of each subplot at an azimuth of 90 degrees, used to inventory seedlings and saplings.

Fixed-radius plot—A circular sample plot of a specified horizontal radius: 1/300 acre = 6.8-foot radius (microplot); 1/24 acre = 24.0-foot radius (subplot).

Forest land—Land that has at least 10 percent cover of live tally tree species of any size, or land formerly having such tree cover, and not currently developed for a nonforest use. The minimum area for classification as forest land is one acre. Roadside, stream-side, and shelterbelt strips of trees must be at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams and other bodies of water, or natural clearings in forested areas are classified as forest if less than 120 feet in width or 1 acre in size. Grazed woodlands, reverting fields, and pastures that are not actively maintained are included if the above qualifications are satisfied. (Note that the canopy cover threshold for forest land was formerly 5 percent rather than 10 percent, and field crews in New Mexico from 2008 to 2012 used the 5 percent threshold. However, sampled conditions with 5–9 percent cover were treated as nonforest for the purposes of this report, and forest attributes are therefore based on the new 10-percent threshold.)

Forest type—A classification of forest land based on the species forming a plurality of live-tree stocking.

Gross growth—The annual increase in volume of trees 5.0 inches d.b.h. and larger in absence of cutting and mortality. Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals before removal, and growth on mortality prior to death.

Growing-stock trees—A live timber species, 5.0 inches d.b.h. or larger, with less than 2/3 (67 percent) of the merchantable volume cull, and containing at least one solid 8-foot section, now or prospectively, reasonably free of form defect, on the merchantable portion of the tree.

Growing-stock volume—The cubic-foot volume of sound wood in growing-stock trees at least 5.0 inches d.b.h. from a 1-foot stump to a minimum 4-inch top d.o.b. to the central stem.

Hardwood trees—Dicotyledonous trees, usually broadleaf and deciduous.

Inventory year—The year in which a plot was scheduled to be completed. Within each subpanel, all plots have the same inventory year. Inventory year may differ from measurement year.

Land use—The classification of a land condition by use or type.

Litter—The uppermost layer of organic debris on a forest floor; that is, essentially the freshly fallen, or only slightly decomposed material, mainly foliage, but also bark fragments, twigs, flowers, fruits, and so forth. Humus is the organic layer, unrecognizable as to origin, immediately beneath the litter layer from which it is derived. Litter and humus together are often termed duff.

Logging residue/products—

- **Bolt—**A short piece of pulpwood; a short log.
- **Industrial wood—**All commercial roundwood products, excluding fuelwood.
- **Logging residue—**The unused sections within the merchantable portions of sound (growing-stock) trees cut or killed during logging operations.
- **Mill or plant residue—**Wood material from mills or other primary manufacturing plants that is not used for the mill's or plant's primary products. Mill or plant residue includes bark, slabs, edgings, trimmings, miscuts, sawdust, and shavings. Much of the mill and plant residue is used as fuel and as the raw material for such products as pulp, palletized fuel, fiberwood, mulch, and animal bedding. Mill or plant residue includes bark and the following components:
- **Coarse residue**—Wood material suitable for chipping, such as slabs, edgings, and trim.
- **Fine residue**—Wood material unsuitable for chipping, such as sawdust and shavings.
- **Pulpwood**—Roundwood, whole-tree chips, or wood residues that are used for the production of wood pulp.
- **Roundwood**—Logs, bolts, or other round sections cut from trees.

Mapped-plot design—A sampling technique that identifies (delineates or maps) and separately classifies distinct "conditions" on the field location sample area. Each condition must meet minimum size requirements. At the most basic level, condition class delineations include forest land, nonforest land, and water. Forest land conditions can be further subdivided into separate condition classes if there are distinct variations in reserved status, owner group, forest type, stand-size class, stand origin, and stand density, given that each distinct area meets minimum size requirements.

Measurement year—The year in which a plot was completed. Measurement year may differ from inventory year.

Merchantable portion—For trees measured at d.b.h. and 5.0-inches d.b.h. and larger, the merchantable portion (or "merchantable bole") includes the part of the tree bole from a 1-foot stump to a 4.0-inch top (d.o.b.). For trees measured at d.r.c., the merchantable portion includes all qualifying segments above the place(s) of diameter measurement for any tree with a single 5.0-inch stem or larger or a cumulative (calculated) d.r.c. of at least 5.0 inches to the 1.5-inch ends of all branches; sections below the place(s) of diameter measurement are not included. Qualifying segments are stems or branches that are a minimum of 1 foot in length and at least 1.0 inch in diameter; portions of stems or branches smaller than 1.0 inch in diameter, such as branch tips, are not included in the merchantable portion of the tree.

Mortality tree—All standing or down dead trees 5.0 inches d.b.h./d.r.c. and larger that were alive within the previous 5 years (in most States); for the 2008–2012 New Mexico inventory, this includes trees that were alive within the previous 10 years.

National Forest System (NFS) lands—Public lands administered by the Forest Service, U.S. Department of Agriculture, such as National Forests, National Grasslands, and some National Recreation Areas.

National Park lands—Public lands administered by the Park Service, U.S. Department of the Interior, such as National Parks, National Monuments, National Historic Sites (such as National Memorials and National Battlefields), and some National Recreation Areas.

Noncensus water—Portions of rivers, streams, sloughs, estuaries, and canals that are 30 to 200 feet wide and at least 1 acre in size; and lakes, reservoirs, and ponds 1 to 4.5 acres in size. Portions of rivers and streams not meeting the criteria for census water, but at least 30 feet wide and 1 acre in size, are considered noncensus water. Portions of braided streams not meeting the criteria for census water, but at least 30 feet in width and 1 acre in size, and more than 50 percent water at normal high-water level are also considered noncensus water.

Nonforest land—Land that does not support, or has never supported, forests, and lands formerly forested where tree regeneration is precluded by development for other uses. Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining rights-of-way, power line clearings of any width, and noncensus water. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide, and clearings, etc., more than 1 acre in size, to qualify as nonforest land.

Nonstocked stand—A formerly stocked stand that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked. For example, recently harvested, burned, or windthrow-damaged areas.

Other Federal lands—Public lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or the Bureau of Land Management, U.S. Department of the Interior.

Other public lands—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture. Includes lands administered by other Federal, State, county, and local government agencies, including lands leased by these agencies for more than 50 years.

Poletimber-size trees—For trees measured at d.b.h, softwoods 5.0 to 8.9 inches d.b.h. and hardwoods 5.0 to 10.9 inches d.b.h. For trees measured at d.r.c., all live trees 5.0 to 8.9 inches d.r.c.

Primary wood processing plants—An industrial plant that processes roundwood products, such as sawlogs, pulpwood bolts, or veneer logs.

Private lands—All lands not owned or managed by a Federal, State, or other public entity, including lands owned by corporations, trusts, or individuals, as well as Tribal lands.

Productive forest land—Forest land capable of producing 20 cubic feet per acre per year of wood from trees classified as a timber species (see Appendix D) on forest land classified as a timber forest type (see Appendix C).

Productivity—The potential yield capability of a stand calculated as a function of site index (expressed in terms of cubic-foot growth per acre per year at age of culmination of mean annual increment). Productivity values for forest land provide an indication of biological potential. Timberland stands are classified by the potential net annual growth attainable in fully stocked natural stands. For FIA reporting, Productivity Class is a variable that groups stand productivity values into categories of a specified range. Productivity is sometimes referred to as "yield" or "mean annual increment."

Removals—The net volume of sound (growing-stock) trees removed from the inventory by harvesting or other cultural operations (such as timber-stand improvement), by land clearing, or by changes in land use (such as a Wilderness designation).

Reserved land—Land withdrawn from management for production of wood products through statute or administrative designation; examples include Wilderness areas and National Parks and Monuments.

Sampling error—A statistical term used to describe the accuracy of the inventory estimates. Expressed on a percentage basis in order to enable comparisons between the precision of different estimates, sampling errors are computed by dividing the estimate into the square root of its variance.

Sapling – A live tree 1.0–4.9-inches d.b.h./d.r.c.

Sawlog portion —The part of the bole of sawtimber-size trees between a 1-foot stump and the sawlog top.

Sawlog top —The point on the bole of sawtimber-size trees above which a sawlog cannot be produced. The minimum sawlog top is 7 inches d.o.b. for softwoods, and 9 inches d.o.b. for hardwoods.

Sawtimber-size trees—Softwoods 9.0 inches d.b.h. and larger and hardwoods 11.0 inches and larger.

Sawtimber volume—The growing-stock volume in the sawlog portion of sawtimber-size trees in board feet.

Seedlings— Live trees less than 1.0 inch d.b.h./d.r.c.

Site index—A measure of forest productivity for a timberland tree/stand. Expressed in terms of the expected height (in feet) of trees on the site at an index age of 50 (or 80 years for aspen and cottonwood). Calculated from height-to-age equations.

Site tree—A tree used to provide an index of site quality. Timber species selected for site index calculations must meet specified criteria with regards to age, diameter, crown class, and damage.

Snag—A standing dead tree.

Softwood trees—Coniferous trees, usually evergreen, having needle- or scale-like leaves.

Stand—A community of trees that can be distinguished from adjacent communities due to similarities and uniformity in tree and site characteristics, such as age-class distribution, species composition, spatial arrangement, structure, etc.

Stand density—A relative measure that quantifies the relationship between trees per acre, stand basal area, average stand diameter, and stocking of a forested stand.

Stand density index (SDI) —A widely used measure developed by Reineke (1933), and is an index that expresses relative stand density based on a comparison of measured stand values with some standard condition; **relative stand density** is the ratio, proportion, or percent of absolute stand density to a reference level defined by some standard level of competition. For FIA reporting, the SDI for a site is usually presented as a percentage of the maximum SDI for the forest type. Site SDI values are sometimes grouped into SDI classes of a specified percentage range. Maximum SDI values vary by species and region.

Standing dead tree—To qualify as a standing dead tally tree, dead trees must be at least 5.0 inches in diameter, have a bole that has an unbroken actual length of at least 4.5 feet, and lean less than 45 degrees from vertical as measured from the base of the tree to 4.5 feet. Portions of boles on dead trees that are separated greater than 50 percent (either above or below 4.5 feet), are considered severed and are included in Down Woody Material (DWM) if they otherwise meet DWM tally criteria. For western woodland species with multiple stems, a tree is considered down if more than 2/3 of the volume is no longer attached or upright; do not consider cut and removed volume. For western woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 5.0 inches in diameter, be at least 1.0 foot in unbroken actual length, and lean less than 45 degrees from vertical.

Stand-size class—A classification of forest land based on the predominant diameter size of live trees presently forming the plurality of live-tree stocking. Classes are defined as follows:

- **Sawtimber stand (Large-tree stand)—**A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees 5.0 inches or larger in diameter, and with sawtimber (large tree) stocking equal to or greater than poletimber (medium tree) stocking.
- **Poletimber stand (Medium-tree stand)—**A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees

5.0 inches or larger in diameter, and with poletimber (medium tree) stocking exceeding sawtimber (large tree) stocking.

- **Sapling/seedling stand—**A stand at least 10 percent stocked with live trees, in which half or more of the total stocking is from live trees less than 5.0-inches in diameter.
- **Nonstocked stand—**A formerly stocked stand that currently has less than 10 percent stocking, but has the potential to again become 10 percent stocked. For example, recently harvested, burned, or windthrow-damaged areas.

Stocking—An expression of the extent to which growing space is effectively utilized by live trees.

Timber species—Tally tree species traditionally used for industrial wood products. These include all species of conifers, except pinyon and juniper. Diameters for timber species are measured at breast height (d.b.h.).

Timber-stand improvement—A term comprising all intermediate cuttings or treatments, such as thinning, pruning, release cutting, girdling, weeding, or poisoning, made to improve the composition, health, and growth of the remaining trees in the stand.

Timberland—Unreserved forest land capable of producing 20 cubic feet per acre per year of wood from trees classified as a timber species (see Appendix D) on forest land designated as a timber forest type (see Appendix C).

Unproductive forest land—Forest land not capable of producing 20 cubic feet per acre per year of wood from trees classified as a timber species (see Appendix D) on forest land designated as a timber forest type and all forest lands designated as a woodland forest type (see Appendix C).

Unreserved forest land—Forest land not withdrawn from management for production of wood products through statute or administrative designation.

Wilderness area—An area of undeveloped land currently included in the Wilderness System, managed to preserve its natural conditions and retain its primeval character and influence.

Woodland species—Tally tree species that are not usually converted into industrial wood products. Common uses of woodland trees are fuelwood, fence posts, and Christmas trees. These species include pinyon, juniper, mesquite, locust, mountain-mahogany (*Cercocarpus* spp.), Rocky Mountain maple, bigtooth maple, desert ironwood, and most oaks (note: bur oak and chinkapin oak are classified as timber species). Because most woodland trees are extremely variable in form, diameter is measured at root collar (d.r.c.).

Appendix B. Standard Forest Resource Tables

Table B1—Percentage of plot area by land status, Idaho, 2006-2015.

Land status			Percentage of sample
Accessible forest land			
	Unreserved forest land		
		Timberland	29.6
		Unproductive	2.3
		Total unreserved forest land	32.0
	Reserved forest land		
		Productive	6.5
		Unproductive	0.2
		Total reserved forest land	6.7
Total accessible forest land			**38.7**
Nonforest and other areas			
	Nonforest land		57.5
	Water		1.2
		Census	1.1
		Non-Census	0.1
Total nonforest and other areas			**58.7**
Non-response			
		Access denied	1.3
		Hazardous conditions	1.1
		Other	0.2
Total non-response			**2.6**
All land			**100.0**

All table cells without observations in the inventory sample are indicated by --.
Table value of 0.0 indicates the percentage rounds to less
than 0.1 percent. Columns and rows may not add to their totals due to rounding.

Table B2—Area of accessible forest land, in thousand acres, by owner class and forest land status, Idaho, 2006-2015.

Owner class		Unreserved forests			Reserved forests			All forest land
		Timberland	Unproductive	Total	Productive	Unproductive	Total	
Forest Service								
	National forest	11,950,952	676,087	12,627,039	3,578,230.2	104,202.1	3,682,432.3	16,309,471.6
Other Federal								
	National Park Service	- -	- -	- -	47,290.2	11,057.3	58,347.5	58,347.5
	Bureau of Land Management	576,897	279,879	856,775	17,878.2	- -	17,878.2	874,653.5
	Departments of Defense and Energy	24,801	16,582	41,383	- -	- -	- -	41,383.4
State and local government								
	State	1,122,857	110,333	1,233,190	12,243.6	- -	12,243.6	1,245,433.5
Private								
	Undifferentiated private	2,856,324	203,865	3,060,189	- -	- -	- -	3,060,188.8
All owners		**16,531,831**	**1,286,746**	**17,818,577**	**3,655,642**	**115,259**	**3,770,902**	**21,589,478**

Table B3—Area of accessible forest land, in thousand acres, by forest-type group and productivity class, Idaho, 2006-2015.

	Site-productivity class (cubic feet/acre/year)							
Forest-type group	**0-19**	**20-49**	**50-84**	**85-119**	**120-164**	**165-224**	**225+**	**Total all classes**
Pinyon / juniper group	312,084.0	- -	- -	- -	- -	- -	- -	312,084.0
Douglas-fir group	71,867.3	2,113,824.4	2,007,866.5	1,304,949.8	589,725.5	84,386.6	6,062.5	6,178,682.6
Ponderosa pine group	12,700.7	286,218.8	685,864.6	431,333.3	113,799.2	18,118.8	- -	1,548,035.3
Western white pine group	- -	2,582.1	6,172.8	4,092.0	14,698.5	17,872.4	- -	45,417.8
Fir / spruce / mountain hemlock group	57,191.6	1,754,093.4	2,034,663.8	1,493,779.4	761,651.3	182,729.0	6,200.2	6,290,308.7
Lodgepole pine group	122,286.9	1,577,047.6	604,926.6	104,222.7	8,897.0	- -	- -	2,417,380.7
Hemlock / Sitka spruce group	- -	61,602.1	228,772.7	343,186.7	194,199.7	24,829.8	- -	852,591.1
Western larch group	- -	38,626.1	109,373.2	120,301.4	7,014.7	5,611.8	- -	280,927.2
Other western softwoods group	217,161.7	381,658.3	18,308.4	- -	- -	- -	- -	617,128.5
Elm / ash / cottonwood group	4,122.6	18,332.3	14,088.8	21,443.1	- -	- -	- -	57,986.8
Aspen / birch group	114,601.0	485,699.6	152,658.8	15,174.2	- -	- -	- -	768,133.6
Alder / maple group	- -	6,200.2	- -	- -	2,042.9	- -	- -	8,243.1
Woodland hardwoods group	338,181.0	- -	- -	- -	- -	- -	- -	338,181.0
Nonstocked	151,808.6	1,201,542.0	354,869.9	123,660.7	34,603.1	7,893.7	- -	1,874,378.1
All forest-type groups	**1,402,005.4**	**7,927,426.9**	**6,217,566.1**	**3,962,143.3**	**1,726,631.9**	**341,442.1**	**12,262.8**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to

Table B4—Area of accessible forest land, in thousand acres, by forest-type group, ownership group, and land status, Idaho, 2006-2015.

Forest-type group	Forest Service		Other Federal		State and local government		Undifferentiated private		All forest land
	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	
Pinyon / juniper group	- -	76,530.4	- -	96,391.9	- -	19,448.7	- -	119,713.0	312,084.0
Douglas-fir group	3,768,533.8	1,065,244.1	240,609.1	6,174.5	263,474.4	- -	834,646.7	- -	6,178,682.6
Ponderosa pine group	740,002.6	207,563.3	33,008.7	- -	123,939.0	6,631.8	436,890.0	- -	1,548,035.3
Western white pine group	11,211.8	- -	- -	- -	- -	5,611.8	28,594.2	- -	45,417.8
Fir / spruce / mountain hemlock group	3,946,724.1	1,122,257.7	111,474.0	5,911.3	408,018.7	6,466.8	689,456.1	- -	6,290,308.7
Lodgepole pine group	1,523,581.2	662,215.6	- -	52,084.0	48,678.7	- -	130,821.2	- -	2,417,380.7
Hemlock / Sitka spruce group	448,146.3	25,010.0	18,651.6	- -	89,999.7	- -	270,783.4	- -	852,591.1
Western larch group	135,627.9	6,172.8	- -	- -	53,406.9	- -	85,719.7	- -	280,927.2
Other western softwoods group	155,104.9	136,147.0	92,542.1	99,391.6	50,746.2	59,792.0	15,935.3	7,469.5	617,128.5
Elm / ash / cottonwood group	12,247.3	- -	6,261.5	-	1,534.3	- -	33,821.1	4,122.6	57,986.8
Aspen / birch group	383,499.2	115,791.8	53,672.6	7,415.2	47,799.4	10,677.4	136,276.4	13,001.7	768,133.6
Alder / maple group	- -	- -	- -	- - - -	- -	- -	8,243.1	- -	8,243.1
Woodland hardwoods group	- -	220,622.2	- -	73,624.4	- -	7,988.4	- -	35,946.0	338,181.0
Nonstocked	826,273.3	720,964.5	45,478.0	31,694.3	35,260.0	5,959.4	185,136.6	23,612.1	1,874,378.1
All forest-type groups	**11,950,952.2**	**4,358,519.4**	**# 601,697.5**	**372,687.0**	**# 1,122,857.3**	**122,576.2**	**# 2,856,323.8**	**203,865.0**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B5—Area of accessible forest land, in thousand acres, by forest-type group and stand-size class, Idaho, 2005-2014.

Forest-type group	Stand-size class				All size classes
	Large diameter	Medium diameter	Small diameter	Nonstocked	
Pinyon / juniper group	274,199.1	30,214.9	7,670.0	- -	312,084.0
Douglas-fir group	5,103,858.9	339,669.3	735,154.4	- -	6,178,682.6
Ponderosa pine group	1,360,304.4	39,699.9	148,031.0	- -	1,548,035.3
Western white pine group	30,575.1	- -	14,842.7	- -	45,417.8
Fir / spruce / mountain hemlock group	4,490,253.0	516,905.0	1,283,150.6	- -	6,290,308.7
Lodgepole pine group	875,562.9	728,380.7	813,437.2	- -	2,417,380.7
Hemlock / Sitka spruce group	724,322.2	54,499.1	73,769.8	- -	852,591.1
Western larch group	151,448.8	51,304.5	78,173.9	- -	280,927.2
Other western softwoods group	435,375.5	50,371.7	131,381.3	- -	617,128.5
Elm / ash / cottonwood group	45,739.5	6,120.2	6,127.1	- -	57,986.8
Aspen / birch group	106,583.0	236,715.6	424,835.0	- -	768,133.6
Alder / maple group	2,042.9	- -	6,200.2	- -	8,243.1
Woodland hardwoods group	166,003.1	90,851.0	81,326.9	- -	338,181.0
Nonstocked	- -	- -	- -	1,874,378.1	1,874,378.1
All forest-type groups	**13,766,268.4**	**2,144,731.9**	**3,804,100.0**	**1,874,378.1**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B6—Area of accessible forest land, in thousand acres, by forest-type group and stand-age class, Idaho, 2006-2015.

Forest-type group	Non-stocked	Stand-age class (years)											All classes
		1-20	21-40	41-60	61-80	81-100	101-120	121-140	141-160	161-180	181-200	201+	
Pinyon / juniper group	-	-	12,247.4	51,086.0	44,308.4	70,347.9	41,216.7	7,567.3	26,570.4	23,213.3	22,613.3	12,913.2	312,084.0
Douglas-fir group	-	568,750.1	332,718.2	439,242.0	968,683.4	1,248,051.2	971,981.6	560,566.3	327,595.9	208,123.0	189,839.1	363,131.8	6,178,682.6
Ponderosa pine group	-	145,602.1	69,267.5	218,637.6	305,459.2	285,938.7	183,026.4	150,139.2	63,087.9	23,999.4	23,274.8	79,602.5	1,548,035.3
Western white pine group	-	14,842.7	13,725.6	--	8,695.7	--	--	2,542.0	5,611.8	--	--	--	45,417.8
Fir / spruce / mountain hemlock group	-	857,112.1	471,330.0	394,897.4	862,927.1	935,662.5	958,310.3	675,107.5	458,920.7	303,672.5	163,706.2	208,662.2	6,290,308.7
Lodgepole pine group	-	691,908.9	193,146.2	191,952.5	411,262.4	430,843.1	210,569.8	161,072.6	59,091.0	21,577.1	24,733.6	21,223.3	2,417,380.7
Hemlock / Sitka spruce group	-	59,702.6	22,394.6	78,225.4	139,107.4	159,853.6	130,492.2	122,117.4	49,527.2	48,342.2	20,977.5	21,851.0	852,591.1
Western larch group	-	78,173.9	24,276.8	26,241.7	62,066.2	46,480.7	27,894.7	6,200.2	3,126.3	6,466.8	--	--	280,927.2
Other western softwoods group	-	65,230.9	57,153.6	6,216.0	55,521.2	73,172.7	70,456.3	43,837.8	42,542.7	28,356.8	43,217.6	131,422.8	617,128.5
Elm / ash / cottonwood group	-	6,127.1	--	4,630.9	14,043.9	22,999.8	10,185.1	--	--	--	--	--	57,986.8
Aspen / birch group	-	309,234.0	116,214.2	91,314.2	148,024.5	79,879.7	17,539.2	5,927.8	--	--	--	--	768,133.6
Alder / maple group	-	6,200.2	2,042.9	--	--	--	--	--	--	--	--	--	8,243.1
Woodland hardwoods group	-	39,999.5	36,031.9	34,082.8	57,571.7	39,392.8	30,626.0	49,017.5	27,317.6	15,726.2	5,602.5	2,812.3	338,181.0
Nonstocked	1,874,378.1	--	--	--	--	--	--	--	--	--	--	--	1,874,378.1
All forest-type groups	**1,874,378.1**	**2,842,884.2**	**1,350,549.0**	**1,536,526.5**	**3,077,671.2**	**3,392,622.9**	**2,652,298.4**	**1,784,095.7**	**1,063,391.5**	**679,477.3**	**493,964.6**	**841,619.1**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B7—Area of accessible forest land, in thousand acres, by forest-type group and stand origin, Idaho, 2006-2015.

Forest-type group	Stand origin		All forest land
	Natural stands	Artificial regeneration	
Pinyon / juniper group	312,084.0	-	312,084.0
Douglas-fir group	6,138,876.5	39,806.1	6,178,682.6
Ponderosa pine group	1,433,022.9	115,012.4	1,548,035.3
Western white pine group	36,662.9	8,754.9	45,417.8
Fir / spruce / mountain hemlock group	6,233,068.9	57,239.8	6,290,308.7
Lodgepole pine group	2,394,661.1	22,719.7	2,417,380.7
Hemlock / Sitka spruce group	852,591.1	-	852,591.1
Western larch group	241,094.4	39,832.9	280,927.2
Other western softwoods group	617,128.5	-	617,128.5
Elm / ash / cottonwood group	57,986.8	-	57,986.8
Aspen / birch group	762,222.3	5,911.3	768,133.6
Alder / maple group	8,243.1	-	8,243.1
Woodland hardwoods group	338,181.0	-	338,181.0
Nonstocked	1,871,410.6	2,967.5	1,874,378.1
All forest-type groups	**21,297,233.9**	**292,244.5**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --.
Table value of 0.0 indicates the acres round to less than 0.1 thousand acres.
Columns and rows may not add to their totals due to rounding.

Table B8—Area of forest land, in thousand acres, by forest-type group and primary disturbance class, Idaho, 2006-2015.

	Disturbance class											
Forest-type group	None	Insects	Disease	Fire	Wild animals	Domestic animals	Weather	Vegetation	Other	Human	Geological	All forest land
Pinyon / juniper group	286,944.7	5,678.3	--	4,369.3	--	15,091.7	--	--	--	--	--	312,084.0
Douglas-fir group	4,765,510.6	536,102.7	376,654.8	330,728.9	7,668.1	114,293.0	--	--	6,085.5	30,817.9	10,821.0	6,178,682.6
Ponderosa pine group	1,339,093.5	17,686.2	24,022.7	137,996.0	--	11,507.1	--	--	--	17,729.8	--	1,548,035.3
Western white pine group	37,283.0	--	5,611.8	--	--	--	--	--	--	2,523.0	--	45,417.8
Fir / spruce / mountain hemlock group	5,057,379.4	352,158.1	531,843.4	179,543.0	12,933.6	40,927.9	37,865.6	--	6,127.1	18,375.8	53,154.8	6,290,308.7
Lodgepole pine group	1,804,383.8	376,590.6	74,383.5	122,954.5	--	39,068.2	--	--	--	--	--	2,417,380.7
Hemlock / Sitka spruce group	761,770.4	--	65,557.4	--	--	--	6,252.5	--	--	12,810.5	6,200.2	852,591.1
Western larch group	242,787.6	--	12,078.6	10,564.9	--	6,127.1	--	--	--	9,369.1	--	280,927.2
Other western softwoods group	458,661.0	68,632.5	12,379.6	44,104.1	--	24,073.0	6,174.5	--	--	--	3,103.7	617,128.5
Elm / ash / cottonwood group	56,452.5	--	--	--	--	1,534.3	--	--	--	--	--	57,986.8
Aspen / birch group	679,259.6	20,347.3	12,425.1	34,160.7	4,445.8	6,198.9	6,130.9	--	--	5,165.3	--	768,133.6
Alder / maple group	8,243.1	--	--	--	--	--	--	--	--	--	--	8,243.1
Woodland hardwoods group	327,976.9	--	--	4,142.2	-	4,433.4	--	--	--	--	1,628.5	338,181.0
Nonstocked	1,122,532.5	54,815.5	23,334.8	621,747.9	5,968.4	32,322.9	--	--	--	12,027.6	1,628.5	1,874,378.1
All forest-type groups	**16,948,278.8**	**1,432,011.2**	**1,138,291.8**	**1,490,311.6**	**31,015.9**	**295,577.5**	**56,423.5**	**--**	**12,212.5**	**108,819.0**	**76,536.7**	**21,589,478.4**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B9—Area of timberland, in thousand acres, by forest-type group and stand-size class, Idaho, 2006-2015.

Forest-type group	Stand-size class				All size classes
	Large diameter	Medium diameter	Small diameter	Nonstocked	
Douglas-fir group	4,278,669.5	284,258.9	544,335.6	- -	5,107,264.0
Ponderosa pine group	1,163,642.1	39,699.9	130,498.2	- -	1,333,840.3
Western white pine group	24,963.3	- -	14,842.7	- -	39,806.0
Fir / spruce / mountain hemlock group	3,801,378.4	415,045.6	939,248.9	- -	5,155,672.9
Lodgepole pine group	684,318.6	559,268.3	459,494.2	- -	1,703,081.1
Hemlock / Sitka spruce group	699,312.2	54,499.1	73,769.8	- -	827,581.0
Western larch group	145,276.0	51,304.5	78,173.9	- -	274,754.4
Other western softwoods group	244,436.0	16,727.3	53,165.0	- -	314,328.4
Elm / ash / cottonwood group	41,616.9	6,120.2	6,127.1	- -	53,864.2
Aspen / birch group	100,655.2	197,911.5	322,680.8	- -	621,247.5
Alder / maple group	2,042.9	- -	6,200.2	- -	8,243.1
Nonstocked	- -	- -	- -	1,092,147.9	1,092,147.9
All forest-type groups	**11,186,311.1**	**1,624,835.4**	**2,628,536.5**	**1,092,147.9**	**16,531,830.9**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B10—Number of live trees (at least 1 inch d.b.h./d.r.c.), in thousand trees, on forest land by species group and diameter class, Idaho, 2006-2015.

Species group		Diameter class (inches)															All classes
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-24.9	25.0-28.9	29.0-32.9	33.0-36.9	37.0+	
Softwood species groups																	
	Western softwood species groups																
	Douglas-fir	430,017,874	203,601,560	137,951,624	111,054,406	91,717,129	76,469,946	59,554,029	46,449,918	30,859,344	22,940,077	25,961,633	11,487,468	4,554,315	2,402,279	1,029,418	1,256,051,021
	Ponderosa and Jeffrey pine	65,363,790	33,378,173	22,349,786	16,027,642	12,219,159	8,881,645	8,833,000	6,313,936	5,229,298	4,317,528	5,957,712	4,038,964	1,782,378	852,585	699,905	196,245,500
	True fir	1,331,880,513	506,399,351	248,842,185	158,894,803	104,868,842	68,305,277	46,449,644	30,372,097	20,747,440	12,625,829	14,905,165	5,025,948	2,717,162	858,094	930,466	2,553,822,815
	Western hemlock	123,671,162	51,412,649	21,841,441	13,919,429	9,101,792	6,053,895	4,063,973	2,588,777	1,805,146	733,791	1,513,676	594,466	222,308	74,296	36,637	237,633,438
	Western white pine	32,479,421	15,297,736	5,709,118	3,732,289	1,771,729	1,634,435	1,105,459	555,424	557,853	255,486	439,108	260,335	71,400	--	--	63,869,794
	Engelmann and other spruces	108,592,594	60,981,711	30,451,514	24,477,473	17,359,698	15,437,795	12,231,565	9,020,297	7,254,056	4,985,536	6,367,940	2,677,975	993,737	924,735	263,274	302,019,899
	Western larch	28,174,485	12,466,233	11,009,290	9,582,044	9,306,520	6,926,642	5,300,016	4,126,448	2,274,354	1,672,553	1,757,265	672,590	378,244	188,949	--	93,835,632
	Lodgepole pine	531,730,488	255,360,003	181,358,072	133,648,543	77,718,268	36,197,210	17,077,432	6,619,083	2,413,848	1,232,550	478,433	35,852	--	--	--	1,243,869,782
	Western redcedar	236,882,676	82,393,529	47,042,124	27,002,690	19,271,754	14,544,356	8,401,809	6,247,943	5,250,293	3,231,567	4,259,933	2,336,236	1,450,476	821,198	1,346,498	460,483,082
	Other western softwoods	17,508,355	11,120,413	8,623,049	7,772,230	5,652,417	3,701,325	2,823,643	2,172,332	1,312,169	945,462	598,562	448,585	206,759	72,199	--	62,957,500
	Other																
	Western woodland softwoods	188,788,236	75,725,275	39,585,341	28,040,332	17,783,131	11,672,101	8,498,390	4,957,044	4,705,172	2,510,345	3,295,665	772,707	401,426	148,603	111,715	386,995,484
All softwoods		3,095,089,594	1,308,136,633	754,763,544	534,151,881	366,770,439	249,824,627	174,338,960	119,423,299	82,408,973	55,450,724	65,535,092	28,351,126	12,778,205	6,342,938	4,417,913	6,857,783,947
Hardwood species groups																	
	Western hardwood species groups																
	Cottonwood and aspen	246,149,053	62,028,975	21,082,555	16,737,054	9,515,750	5,359,539	1,529,282	736,647	411,412	257,552	300,224	148,485	113,236	38,917	--	364,408,682
	Red alder	2,771,023	2,282,003	821,143	484,244	71,085	148,425	37,313	111,940	--	--	--	--	--	--	--	6,727,177
	Other western hardwoods	19,904,926	6,966,823	6,356,814	3,311,585	1,857,296	997,714	148,827	75,256	76,545	--	--	--	--	--	--	39,695,786
	Other																
	Western woodland hardwoods	134,965,245	48,023,454	18,183,269	12,061,266	5,482,316	2,831,791	1,308,030	436,539	378,794	367,187	89,865	--	--	--	--	224,127,756
All hardwoods		403,790,247	119,301,255	46,443,781	32,594,149	16,926,447	9,337,469	3,023,452	1,360,382	866,751	624,739	390,089	148,485	113,236	38,917	0	634,959,401
All species groups		**3,498,879,841**	**1,427,437,888**	**801,207,325**	**566,746,030**	**383,696,886**	**259,162,096**	**177,362,412**	**120,783,681**	**83,275,724**	**56,075,463**	**65,925,181**	**28,499,611**	**12,891,441**	**6,381,855**	**4,417,913**	**7,492,743,348**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the number of trees rounds to less than 1 thousand trees. Columns and rows may not add to their totals due to rounding.

Table B11—Number of growing stock trees (at least 5 inches d.b.h.), in thousand trees, on timberland by species group and diameter class, Idaho, 2006-2015.

		Diameter class (inches)													
Species group		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-24.9	25.0-28.9	29.0-32.9	33.0-36.9	37.0+	All classes
Softwood species groups															
	Western softwood species groups														
	Douglas-fir	111,903,314	90,373,745	76,234,458	62,590,588	51,238,099	39,510,742	26,277,594	19,323,604	21,886,701	10,042,301	3,846,751	1,993,700	806,503	516,028,101
	Ponderosa and	20,188,510	14,642,305	10,946,674	8,207,253	7,857,864	5,560,606	4,625,189	3,334,305	5,055,722	3,360,605	1,445,456	628,327	624,649	86,477,466
	True fir	201,000,287	129,090,987	88,582,441	57,817,146	40,592,582	27,340,273	18,905,428	11,237,887	13,160,252	4,612,042	2,231,148	708,726	818,817	596,098,017
	Western hemlo	21,475,022	13,772,523	9,028,159	6,053,895	4,063,973	2,551,464	1,767,998	733,791	1,513,676	594,466	222,308	74,296	36,637	61,888,208
	Western white	5,561,056	3,695,653	1,771,729	1,634,435	1,068,310	555,424	557,853	255,486	371,564	260,335	37,628	--	--	15,769,474
	Engelmann an	23,191,106	18,715,974	12,947,630	11,709,239	8,669,107	6,774,116	5,907,211	3,711,638	4,979,417	2,192,865	806,067	586,084	188,488	100,378,942
	Western larch	10,863,735	9,544,896	9,231,744	6,852,345	5,188,092	4,015,003	2,274,354	1,672,553	1,720,117	672,590	378,244	188,949	--	52,602,622
	Lodgepole pine	128,983,982	104,269,640	59,279,546	29,068,069	13,499,417	5,387,303	1,963,823	972,089	403,647	--	--	--	--	343,827,516
	Western redce	45,199,960	26,218,282	18,900,637	14,318,589	8,139,558	5,910,087	5,099,781	3,118,683	3,996,538	2,148,096	1,262,336	821,198	1,045,790	136,179,536
	Other western	27,214,695	19,686,152	12,215,350	8,352,812	6,359,501	3,629,832	3,440,662	1,695,931	2,442,276	518,502	297,185	111,444	37,148	86,001,491
All softwoods		595,581,665	430,010,157	299,138,370	206,604,372	146,676,503	101,234,849	70,819,893	46,055,967	55,529,912	24,401,803	10,527,125	5,112,725	3,558,031	1,995,251,373
Hardwood species groups															
	Western hardwood species														
	Cottonwood and aspen	14,685,351	12,448,032	8,172,118	4,638,013	1,304,390	624,724	263,594	219,794	300,224	148,485	74,319	--	--	42,879,045
	Red alder	821,143	484,244	71,085	148,425	37,313	111,940	--	--	--	--	--	--	--	1,674,151
	Other western	5,606,638	3,084,843	1,670,148	922,458	148,827	75,256	76,545	--	--	--	--	--	--	11,584,715
All hardwoods		21,113,133	16,017,119	9,913,351	5,708,895	1,490,530	811,920	340,139	219,794	300,224	148,485	74,319	--	--	56,137,911
All species groups		**616,694,799**	**446,027,277**	**309,051,721**	**212,313,267**	**148,167,033**	**102,046,769**	**71,160,032**	**46,275,761**	**55,830,136**	**24,550,288**	**10,601,443**	**5,112,725**	**3,558,031**	**2,051,389,283**

All table cells without observations in the inventory sample are indicated by –. Table value of 0 indicates the number of trees rounds to less than 1 thousand trees. Columns and rows may not add to their totals due to rounding.

Table B12—Net volume of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, by owner class and forest land status, Idaho, 2006-2015.

Owner class		Unreserved forests			Reserved forests			All forest land
		Timberland	Unproductive	Total	Productive	Unproductive	Total	
Forest Service								
	National forest	31,734,835,242.0	410,153,824.0	32,144,989,066.0	6,021,631,819.0	47,076,629.0	6,068,708,449	38,213,697,515.0
Other Federal								
	National Park Service	--	--	--	53,962,959.0	4,506,123.0	58,469,082.0	58,469,082.0
	Bureau of Land Management	1,073,615,013.0	108,843,337.0	1,182,458,350.0	23,634,883.0	--	23,634,883.0	1,206,093,233.0
	Departments of Defense and Energy	185,930,044.0	9,155,986.0	195,086,031.0	--	--	--	195,086,031.0
State and local government								
	State	2,872,581,360.0	43,215,883.0	2,915,797,243.0	28,725,141.0	--	28,725,141.0	43,215,883.0
Private								
	Undifferentiated private	5,251,379,619.0	107,505,243.0	5,358,884,863.0	--	--	--	107,505,243.0
All owners		**41,118,341,278.0**	**678,874,273.0**	**41,797,215,553.0**	**6,127,954,802.0**	**51,582,752.0**	**6,179,537,555.0**	**47,976,753,108.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B13—Net volume of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by forest-type group and stand-size class, Idaho, 2006-2015.

	Stand-size class				
Forest-type group	Large diameter	Medium diameter	Small diameter	Nonstocked	All size classes
Pinyon / juniper group	160,685,655	5,980,499	465,178	- -	167,131,332
Douglas-fir group	14,135,092,896	387,927,407	309,789,040	- -	14,832,809,344
Ponderosa pine group	3,187,885,659	20,108,121	19,944,810	- -	3,227,938,590
Western white pine group	80,312,610	- -	4,225,444	- -	84,538,054
Fir / spruce / mountain hemlock group	17,782,562,658	770,247,405	575,522,649	- -	19,128,332,712
Lodgepole pine group	2,300,684,040	1,377,074,834	223,082,324	- -	3,900,841,197
Hemlock / Sitka spruce group	4,309,644,708	123,658,449	32,428,956	- -	4,465,732,113
Western larch group	601,594,898	81,412,415	36,427,178	- -	719,434,491
Other western softwoods group	380,203,068	22,674,759	24,063,270	- -	426,941,097
Elm / ash / cottonwood group	131,149,706	5,070,150	- -	- -	136,219,856
Aspen / birch group	178,029,240	287,211,353	118,976,105	- -	584,216,697
Alder / maple group	5,712,395	- -	- -	- -	5,712,395
Woodland hardwoods group	79,907,899	36,182,454	14,562,744	- -	130,653,097
Nonstocked	- -	- -	- -	166,252,133	166,252,133
All forest-type groups	**43,333,465,432**	**3,117,547,846**	**1,359,487,698**	**166,252,133**	**47,976,753,108**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B14—Net volume of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by species group and ownership group, Idaho, 2006-2015.

Species group	Ownership group				
	Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups					
Western softwood species groups					
Douglas-fir	11,201,351,810	503,728,839	723,458,920	1,617,913,218	14,046,452,786
Ponderosa and Jeffrey pine	2,115,550,226	67,439,852	208,405,038	696,283,840	3,087,678,957
True fir	10,818,369,074	290,967,461	1,004,456,635	1,238,191,242	13,351,984,412
Western hemlock	888,900,663	22,830,178	66,225,674	198,024,328	1,175,980,844
Western white pine	207,165,805	7,942,639	51,383,458	74,368,052	340,859,955
Engelmann and other spruces	3,720,681,004	72,706,464	149,182,566	145,403,478	4,087,973,512
Western larch	1,049,962,456	43,180,725	158,695,874	251,420,699	1,503,259,755
Lodgepole pine	4,317,771,904	61,491,655	128,291,754	209,703,779	4,717,259,092
Western redcedar	2,263,220,893	58,881,404	315,432,970	610,359,974	3,247,895,241
Other western softwoods	1,248,043,709	181,361,828	58,337,001	19,809,151	1,507,551,689
Other					
Western woodland softwoods	54,437,080	55,332,061	5,744,992	63,710,211	179,224,344
All softwoods	37,885,454,625.0	1,365,863,106.0	2,869,614,883.0	5,125,187,973.0	47,246,120,587.0
Hardwood species groups					
Western hardwood species groups					
Cottonwood and aspen	243,164,331.0	52,058,071.0	60,979,096.0	160,489,986.0	516,691,484.0
Red alder	1,243,435.0	10,742,652.0	1,151,941.0	4,835,305.0	17,973,333.0
Other western hardwoods	30,885,745.0	7,672,086.0	8,697,167.0	54,456,604.0	101,711,603.0
Other					
Western woodland hardwoods	52,949,379.0	23,312,431.0	4,079,297.0	13,914,995.0	94,256,102.0
All hardwoods	328,242,890.0	93,785,240.0	74,907,501.0	233,696,890.0	730,632,521.0
All species groups	**38,213,697,515.0**	**1,459,648,346.0**	**2,944,522,384.0**	**5,358,884,863.0**	**47,976,753,108.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B15—Net volume of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by species group and diameter class, Idaho, 2006-2015.

		Diameter class (inches)													
Species group		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-24.9	25.0-28.9	29.0-32.9	33.0-36.9	37.0+	All classes
Softwood species groups															
	Western softwood species groups														
	Douglas-fir	323,537,423	616,625,870	959,379,683	1,314,343,377	1,544,284,294	1,659,918,651	1,469,511,468	1,389,750,961	2,092,710,597	1,281,746,541	665,084,452	475,387,345	254,172,124	14,046,452,786
	Ponderosa and Jeffrey pine	32,643,828	64,273,325	96,137,379	125,771,546	196,821,142	202,963,343	241,714,172	267,870,972	524,710,602	515,013,840	340,266,201	205,371,189	274,121,417	3,087,678,957
	True fir	825,672,463	1,114,374,369	1,347,802,858	1,418,837,682	1,480,574,044	1,381,016,873	1,292,724,682	1,002,111,374	1,588,367,705	767,639,443	547,787,863	221,426,024	363,649,033	13,351,984,412
	Western hemlock	47,507,325	86,350,415	111,133,930	126,234,721	132,319,229	117,870,521	109,678,778	63,111,940	181,688,757	99,126,201	55,311,299	29,628,846	16,018,883	1,175,980,844
	Western white pine	13,459,363	23,399,980	21,536,467	33,459,499	35,560,847	28,416,064	41,543,719	22,350,148	55,697,413	48,410,419	17,026,034	--	--	340,859,955
	Engelmann and other spruces	96,618,609	171,658,280	222,097,533	319,509,269	396,127,865	399,624,507	438,785,198	394,656,038	698,370,369	410,166,304	203,252,063	245,514,666	91,592,811	4,087,973,512
	Western larch	31,783,352	70,417,177	137,063,459	166,148,827	186,018,925	197,851,325	147,098,256	139,420,428	191,696,138	104,970,002	80,204,865	50,586,999	--	1,503,259,755
	Lodgepole pine	580,735,701	1,029,136,834	1,114,226,236	837,729,519	564,393,302	312,044,171	141,008,484	91,864,267	43,621,808	2,498,769	--	--	--	4,717,259,092
	Western redcedar	160,503,400	169,601,047	209,018,939	250,695,079	215,959,792	224,834,474	254,490,429	192,515,425	356,651,651	278,447,573	227,032,517	173,434,438	534,710,476	3,247,895,241
	Other western softwoods	58,468,329	112,538,053	141,153,644	154,341,527	165,969,036	132,140,486	170,857,270	116,309,376	243,135,797	82,546,658	73,017,487	31,887,486	25,186,540	1,507,551,689
	Other														
	Western woodland softwoods	7,360,100	14,210,961	18,993,453	21,327,947	20,201,106	25,698,529	18,509,279	17,474,266	13,232,882	10,920,237	8,648,681	2,646,903	--	179,224,344
All softwoods		2,178,289,895	3,472,586,311	4,378,543,581	4,768,398,993	4,938,229,581	4,682,378,945	4,325,921,735	3,697,435,195	5,989,883,720	3,601,485,988	2,217,631,462	1,435,883,896	1,559,451,285	47,246,120,587
Hardwood species groups															
	Western hardwood species groups														
	Cottonwood and aspen	47,458,629	90,330,257	99,035,538	93,418,142	36,436,122	28,178,509	18,433,308	16,159,182	28,056,435	21,528,566	25,828,781	11,828,016	--	516,691,484
	Red alder	2,659,793	3,148,132	923,194	3,936,438	1,491,266	5,814,511	--	--	--	--	--	--	--	17,973,333
	Other western hardwoods	21,159,476	25,336,462	24,843,285	19,612,845	4,112,287	2,873,249	3,773,997	--	--	--	--	--	--	101,711,603
	Other														
	Western woodland hardwoods	18,262,043	22,268,431	16,170,979	13,691,652	9,051,346	4,037,859	4,004,499	4,873,196	1,896,097	--	--	--	--	94,256,102
All hardwoods		89,539,942	141,083,282	140,972,996	130,659,077	51,091,021	40,904,128	26,211,805	21,032,378	29,952,531	21,528,566	25,828,781	11,828,016	--	730,632,521
All species groups		**2,267,829,837**	**3,613,669,593**	**4,519,516,577**	**4,899,058,070**	**4,989,320,602**	**4,723,283,072**	**4,352,133,540**	**3,718,467,573**	**6,019,836,251**	**3,623,014,555**	**2,243,460,243**	**1,447,711,912**	**1,559,451,285**	**47,976,753,108**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B16—Net volume of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by forest-type group and stand origin, Idaho, 2006-2015.

Forest-type group	Stand origin		All forest land
	Natural stands	Artificial regeneration	
Pinyon / juniper group	167,131,332.0	- -	167,131,332.0
Douglas-fir group	14,806,682,294.0	26,127,050.0	14,832,809,344.0
Ponderosa pine group	3,181,355,357.0	46,583,233.0	3,227,938,590.0
Western white pine group	82,480,288.0	2,057,767.0	84,538,054.0
Fir / spruce / mountain hemlock group	19,115,551,835.0	12,780,877.0	19,128,332,712.0
Lodgepole pine group	3,893,569,742.0	7,271,456.0	3,900,841,197.0
Hemlock / Sitka spruce group	4,465,732,113.0	- -	4,465,732,113.0
Western larch group	707,625,098.0	11,809,393.0	719,434,491.0
Other western softwoods group	426,941,097.0	- -	426,941,097.0
Elm / ash / cottonwood group	136,219,856.0	- -	136,219,856.0
Aspen / birch group	582,638,025.0	1,578,672.0	584,216,697.0
Alder / maple group	5712395	- -	5712395
Woodland hardwoods group	130,653,097.0	- -	130,653,097.0
Nonstocked	166,252,133.0	- -	166,252,133.0
All forest-type groups	**47,868,544,662.0**	**108,208,447.0**	**47,976,753,108.0**

All table cells without observations in the inventory sample are indicated by --.
Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet.
Columns and rows may not add to their totals due to rounding.

Table B17—Net volume of growing stock trees (at least 5 inches d.b.h.), in cubic feet, on timberland by species group and diameter class, Idaho, 2006-2015.

		Diameter class (inches)													
Species group		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-24.9	25.0-28.9	29.0-32.9	33.0-36.9	37.0+	All classes
Softwood species groups															
	Western softwood species groups														
	Douglas-fir	265,589,100	505,972,173	803,825,053	1,082,437,305	1,336,230,872	1,426,686,810	1,264,365,304	1,190,086,404	1,794,410,106	1,141,838,620	573,973,995	397,655,881	220,741,198	12,003,812,819
	Ponderosa and Jeffrey pine	29,723,005	57,538,324	84,796,685	115,474,724	174,449,564	176,451,979	211,894,956	206,138,289	442,091,002	425,145,958	275,094,672	148,892,456	247,037,582	2,594,729,195
	True fir	657,870,031	915,205,826	1,155,271,096	1,223,269,358	1,318,551,440	1,260,160,749	1,193,819,369	905,900,460	1,432,971,697	708,719,216	470,301,799	193,217,171	330,062,954	11,765,321,165
	Western hemlock	47,037,108	85,680,069	110,927,890	126,234,721	132,319,229	117,307,630	108,919,125	63,111,940	181,688,757	99,126,201	55,311,299	29,628,846	16,018,883	1,173,311,698
	Western white pine	13,300,452	23,195,208	21,536,467	33,459,499	34,432,252	28,416,064	41,543,719	22,350,148	45,907,951	48,410,419	10,417,125	--	--	322,969,306
	Engelmann and other spruces	73,918,595	130,623,539	163,436,766	243,906,208	281,484,644	296,428,139	357,138,048	291,169,180	544,272,520	332,350,906	164,819,910	151,216,862	69,729,921	3,100,495,237
	Western larch	31,445,446	69,909,126	135,705,886	164,051,573	181,877,940	192,662,486	147,098,256	139,420,428	187,489,048	104,970,002	80,204,865	50,586,999	--	1,485,422,056
	Lodgepole pine	411,897,992	807,247,516	857,592,094	683,171,977	456,558,549	258,962,820	114,935,878	76,017,880	37,285,202	--	--	--	--	3,703,669,909
	Western redcedar	154,580,293	165,026,241	205,099,977	246,700,886	209,558,417	213,500,420	246,867,345	185,266,503	332,115,913	257,114,222	193,311,846	173,434,438	385,230,307	2,967,806,809
	Other western softwoods	39,343,579	82,008,034	101,730,157	120,888,147	135,593,874	108,602,574	142,052,542	89,065,527	208,231,858	66,591,898	63,222,040	29,467,843	14,175,515	1,200,973,587
All softwoods		1,724,705,601	2,842,406,056	3,639,922,071	4,039,594,398	4,261,056,779	4,079,179,671	3,828,634,542	3,168,526,758	5,206,464,052	3,184,267,443	1,886,657,552	1,174,100,495	1,282,996,360	40,318,511,780
Hardwood species groups															
	Western hardwood species groups														
	Cottonwood and aspen	36,517,985	72,828,771	88,408,628	84,743,159	33,593,185	25,683,131	12,352,566	16,159,182	28,056,435	21,528,566	14,924,754	--	--	434,796,362
	Red alder	2,659,793	3,148,132	923,194	3,936,438	1,491,266	5,814,511	--	--	--	--	--	--	--	17,973,333
	Other western hardwoods	18,950,949	24,076,603	22,515,608	18,097,582	4,112,287	2,873,249	3,773,997	--	--	--	--	--	--	94,400,276
All hardwoods		58,128,727	100,053,506	111,847,430	106,777,179	39,196,739	34,370,891	16,126,563	16,159,182	28,056,435	21,528,566	14,924,754	--	--	547,169,971
All species groups		**1,782,834,328**	**2,942,459,562**	**3,751,769,501**	**4,146,371,577**	**4,300,253,518**	**4,113,550,562**	**3,844,761,106**	**3,184,685,939**	**5,234,520,487**	**3,205,796,009**	**1,901,582,306**	**1,174,100,495**	**1,282,996,360**	**40,865,681,751**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B18—Net volume of growing stock trees (at least 5 inches d.b.h.), in cubic feet, on timberland by species group and ownership group, Idaho, 2006-2015.

Species group	Ownership group				
	Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups					
Western softwood species groups					
Douglas-fir	9,195,936,894.0	482,199,212.0	717,481,294.0	1,608,195,419.0	12,003,812,819.0
Ponderosa and Jeffrey pine	1,634,069,495.0	67,380,276.0	197,751,891.0	695,527,534.0	2,594,729,195.0
True fir	9,248,173,827.0	284,747,122.0	996,108,946.0	1,236,291,269.0	11,765,321,165.0
Western hemlock	887,569,344.0	22,830,178.0	65,788,442.0	197,123,733.0	1,173,311,698.0
Western white pine	206,802,122.0	6,814,044.0	34,985,087.0	74,368,052.0	322,969,306.0
Engelmann and other spruces	2,736,683,212.0	69,353,295.0	149,055,252.0	145,403,478.0	3,100,495,237.0
Western larch	1,032,211,503.0	43,180,725.0	158,695,874.0	251,333,953.0	1,485,422,056.0
Lodgepole pine	3,353,656,671.0	12,427,878.0	128,170,602.0	209,414,758.0	3,703,669,909.0
Western redcedar	1,985,823,385.0	58,778,517.0	314,914,928.0	608,289,979.0	2,967,806,809.0
Other western softwoods	1,022,961,634.0	132,019,698.0	28,740,181.0	17,252,072.0	1,200,973,587.0
All softwoods	31,303,888,088.0	1,179,730,944.0	2,791,692,498.0	5,043,200,250.0	40,318,511,780.0
Hardwood species groups					
Western hardwood species groups					
Cottonwood and aspen	199,329,429.0	48,839,374.0	57,605,524.0	129,022,035.0	434,796,362.0
Red alder	1,243,435.0	10,742,652.0	1,151,941.0	4,835,305.0	17,973,333.0
Other western hardwoods	24,079,132.0	7,603,547.0	8,556,519.0	54,161,078.0	94,400,276.0
All hardwoods	224,651,996.0	67,185,573.0	67,313,984.0	188,018,418.0	547,169,971.0
All species groups	**31,528,540,085.0**	**1,246,916,517.0**	**2,859,006,482.0**	**5,231,218,667.0**	**40,865,681,751.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B19—Net volume of sawtimber trees, in board feet (International 1/4 inch rule), on timberland by species group and diameter class, Idaho, 2006-2015.

	Diameter class (inches)											
Species group	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-24.9	25.0-28.9	29.0-32.9	33.0-36.9	37.0+	All classes
Softwood species groups												
Western softwood species groups												
Douglas-fir	3,180,945,479	5,052,234,793	6,809,977,409	7,687,194,943	7,115,733,734	6,936,615,458	10,825,039,211	7,209,747,155	3,735,501,172	2,649,722,788	1,530,056,599	62,732,768,741
Ponderosa and Jeffrey pine	175,390,647	502,352,688	960,328,215	1,083,623,645	1,396,350,585	1,411,177,355	3,140,662,000	3,232,778,481	2,291,849,546	1,262,226,992	2,203,912,291	17,660,652,446
True fir	5,547,099,919	6,523,323,831	7,467,966,393	7,421,247,598	7,292,205,583	5,685,155,968	9,284,355,052	4,677,697,616	3,158,557,194	1,342,833,655	2,399,456,610	60,799,899,418
Western hemlock	481,155,531	655,613,010	740,278,893	688,596,243	650,237,981	384,966,488	1,146,642,067	632,076,847	357,748,844	192,700,122	104,262,897	6,034,278,923
Western white pine	109,745,377	187,860,789	204,823,066	173,767,948	249,929,554	144,726,685	301,156,821	327,436,073	73,088,676	--	--	1,772,534,989
Engelmann and other spruces	905,785,612	1,390,376,991	1,631,862,233	1,732,316,275	2,089,246,060	1,705,732,177	3,287,646,452	2,130,279,103	1,068,023,037	1,001,882,876	464,226,002	17,407,376,819
Western larch	731,831,273	906,939,661	1,027,292,183	1,108,490,253	858,894,751	827,624,292	1,126,780,104	626,464,870	456,128,034	295,409,215	--	7,965,854,635
Lodgepole pine	4,864,475,692	3,775,117,524	2,507,793,826	1,401,169,296	610,906,917	406,731,536	200,717,061	--	--	--	--	13,766,911,851
Western redcedar	1,000,944,492	1,285,876,401	1,130,960,507	1,172,570,391	1,388,690,611	1,050,225,171	1,902,950,596	1,489,376,827	1,122,658,668	995,900,538	2,241,847,319	14,782,001,520
Other western softwoods	453,229,666	591,584,255	720,665,332	600,460,037	809,491,272	516,208,503	1,276,825,550	413,022,535	407,886,259	185,653,070	89,380,800	6,064,407,279
All softwoods	17,450,603,689	20,871,279,943	23,201,948,056	23,069,436,629	22,461,687,048	19,069,163,633	32,492,774,913	20,738,879,507	12,671,441,430	7,926,329,256	9,033,142,518	208,986,686,621
Hardwood species groups												
Western hardwood species groups												
Cottonwood and aspen	--	431,021,287	171,399,358	132,294,951	64,953,236	86,759,842	153,116,646	99,652,843	71,492,987	--	--	1,210,691,150
Red alder	--	21,779,988	8,433,147	33,378,671	--	--	--	--	--	--	--	63,591,806
Other western hardwoods	--	95,485,567	22,927,980	16,235,140	21,591,121	--	--	--	--	--	--	156,239,808
All hardwoods	--	548,286,841	202,760,485	181,908,761	86,544,358	86,759,842	153,116,646	99,652,843	71,492,987	--	--	1,430,522,764
All species groups	**17,450,603,689**	**21,419,566,784**	**23,404,708,541**	**23,251,345,390**	**22,548,231,405**	**19,155,923,475**	**32,645,891,559**	**20,838,532,350**	**12,742,934,418**	**7,926,329,256**	**9,033,142,518**	**210,417,209,385**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the volume rounds to less than 1 million board feet. Columns and rows may not add to their totals due to rounding.

Table B20—Net volume of sawlog portion of sawtimber trees, in cubic feet, on timberland by species group and ownership group, Idaho, 2006-2015.

Species group	Ownership group				
	Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups					
Western softwood species groups					
Douglas-fir	7,923,301,497.0	407,387,696.0	599,725,052.0	1,288,757,729.0	10,219,171,974.0
Ponderosa and Jeffrey pine	1,482,675,267.0	62,034,006.0	169,273,042.0	595,730,321.0	2,309,712,636.0
True fir	7,276,865,655.0	230,801,154.0	794,939,292.0	879,681,037.0	9,182,287,138.0
Western hemlock	695,559,507.0	17,807,831.0	46,778,987.0	122,551,143.0	882,697,468.0
Western white pine	177,469,584.0	6,203,609.0	30,579,494.0	56,102,291.0	270,354,977.0
Engelmann and other spruces	2,322,312,092.0	61,758,453.0	125,428,146.0	116,883,360.0	2,626,382,050.0
Western larch	887,882,026.0	39,248,244.0	129,076,586.0	192,232,171.0	1,248,439,027.0
Lodgepole pine	2,044,670,847.0	6,455,492.0	87,669,459.0	132,281,310.0	2,271,077,108.0
Western redcedar	1,577,707,927.0	46,604,756.0	225,268,584.0	408,278,268.0	2,257,859,534.0
Other western softwoods	790,966,143.0	111,008,449.0	25,539,166.0	14,549,856.0	942,063,614.0
All softwoods	25,179,410,545.0	989,309,689.0	2,234,277,807.0	3,807,047,485.0	32,210,045,525.0
Hardwood species groups					
Western hardwood species groups					
Cottonwood and aspen	68,100,842.0	25,842,412.0	19,285,541.0	69,646,315.0	182,875,110.0
Red alder	- -	8,034,869.0	- -	362,524.0	8,397,392.0
Other western hardwoods	6,919,791.0	1,295,659.0	1,033,273.0	12,073,960.0	21,322,683.0
All hardwoods	75,020,633.0	35,172,940.0	20,318,813.0	82,082,799.0	212,595,186.0
All species groups	**25,254,431,178.0**	**1,024,482,629.0**	**2,254,596,620.0**	**3,889,130,284.0**	**32,422,640,711.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B21—Average annual net growth of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, by owner class and forest land status, Idaho, 2006-2015.

		Unreserved forests			Reserved forests			All
Owner class		Timberland	Unproductive	Total	Productive	Unproductive	Total	forest land
Forest Service								
	National forest	158,653,008.4	-9,207,291.7	149,445,716.7	-137,061,074.0	-3,795,648.3	-140,856,722.3	8,588,994.4
Other Federal								
	National Park Service	- -	- -	- -	1,345,848.7	199,413.2	1,545,262.0	1,545,262.0
	Bureau of Land Management	15,460,372.8	-2,790,665.5	12,669,707.3	198,067.5	- -	198,067.5	12,867,774.8
	Departments of Defense and Energy	4,149,054.5	14,790.7	4,163,845.2	- -	- -	- -	4,163,845.2
State and local government								
	State	71,763,607.3	863,361.6	72,626,968.9	575,038.4	-	575,038.4	73,202,007.4
Private								
	Undifferentiated private	202,435,234.6	1,842,249.6	204,277,484.2	- -	- -	- -	204,277,484.2
All owners		**452,461,277.6**	**-9,277,555.3**	**443,183,722.3**	**-134,942,119.4**	**-3,596,235.1**	**-138,538,354.4**	**304,645,367.9**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B22—Average annual net growth of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by forest-type group and stand-size class, Idaho, 2006-2015.

Forest-type group	Stand-size class				All size classes
	Large diameter	Medium diameter	Small diameter	Nonstocked	
Pinyon / juniper group	1,672,178.3	308,599.4	-32,479.7	- -	1,948,298.0
Douglas-fir group	129,923,132.7	17,047,648.7	-6,861,708.1	- -	140,109,073.3
Ponderosa pine group	45,338,630.3	2,228,161.3	506,008.1	- -	48,072,799.7
Western white pine group	2,281,103.5	- -	231,796.6	- -	2,512,900.1
Fir / spruce / mountain hemlock group	230,725,277.2	19,202,394.1	-32,755,041.1	- -	217,172,630.2
Lodgepole pine group	-6,737,303.8	11,699,233.0	-35,619,641.4	- -	-30,657,712.2
Hemlock / Sitka spruce group	70,025,611.3	8,004,306.0	-204,416.2	- -	77,825,501.0
Western larch group	10,653,877.4	5,503,277.9	-4,501,875.9	- -	11,655,279.4
Other western softwoods group	-1,473,345.4	-4,109,765.8	-4,193,661.9	- -	-9,776,773.0
Elm / ash / cottonwood group	2,844,517.0	220,990.0	- -	- -	3,065,506.9
Aspen / birch group	4,425,824.3	7,497,752.5	-2,083,116.0	- -	9,840,460.8
Alder / maple group	512,068.1	- -	- -	- -	512,068.1
Woodland hardwoods group	1,384,183.4	657,322.9	479,678.9	- -	2,521,185.1
Nonstocked	- -	- -	- -	-170,155,849.5	-170,155,849.5
All forest-type groups	**491,575,754.3**	**68,259,919.8**	**-85,034,456.8**	**-170,155,849.5**	**304,645,367.9**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B23—Average annual net growth of all live trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by species group and ownership group, Idaho, 2006-2015.

Species group			Ownership group				
			Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups							
	Western softwood species groups						
		Douglas-fir	-6,108,649.1	7,228,595.8	14,501,935.2	59,165,574.9	74,787,456.8
		Ponderosa and Jeffrey pine	5,185,863.5	874,142.4	6,593,928.0	22,729,347.4	35,383,281.3
		True fir	107,170,124.4	7,149,030.8	30,679,106.4	60,622,850.6	205,621,112.2
		Western hemlock	16,871,647.5	612,642.7	2,283,927.0	8,837,916.2	28,606,133.4
		Western white pine	728,819.1	-512,455.3	-43,109.4	4,158,825.6	4,332,080.0
		Engelmann and other spruces	16,448,104.6	1,372,262.1	2,152,201.0	4,664,487.4	24,637,055.1
		Western larch	6,835,402.6	279,666.1	2,682,121.1	6,617,258.5	16,414,448.3
		Lodgepole pine	-161,784,278.3	-1,259,779.4	1,072,630.2	4,144,503.4	-157,826,924.1
		Western redcedar	38,123,733.2	1,367,194.8	10,634,568.3	27,287,518.1	77,413,014.4
		Other western softwoods	-19,839,907.5	656,894.5	998,875.9	198,857.4	-17,985,279.6
	Other						
		Western woodland softwoods	536,236.6	-563,014.9	125,428.5	870,396.7	969,046.9
All softwoods			4,167,096.7	17,205,179.6	71,681,612.1	199,297,536.3	292,351,424.7
Hardwood species groups							
	Western hardwood species groups						
		Cottonwood and aspen	4,195,206.3	713,383.5	1,327,656.6	3,111,669.8	9,347,916.1
		Red alder	-173,997.8	133,369.2	105,274.3	395,114.8	459,760.6
		Other western hardwoods	-469,303.3	177,905.9	18,292.7	1,107,928.9	834,824.2
	Other						
		Western woodland hardwoods	869,992.5	347,043.8	69,171.7	365,234.3	1,651,442.3
All hardwoods			4,421,897.7	1,371,702.4	1,520,395.3	4,979,947.8	12,293,943.2
All species groups			**8,588,994.4**	**18,576,882.0**	**73,202,007.4**	**204,277,484.2**	**304,645,367.9**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B24—Average annual net growth of growing stock trees (at least 5 inches d.b.h.), in cubic feet, on timberland by species group and ownership group, Idaho, 2006-2015.

Species group			Ownership group				
			Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups							
	Western softwood species groups						
		Douglas-fir	45,468,416.5	6,886,525.9	14,689,243.7	58,885,673.0	125,929,859.1
		Ponderosa and Jeffrey pine	7,720,405.8	873,345.7	5,943,953.7	22,639,864.8	37,177,570.0
		True fir	128,957,500.5	7,031,726.1	30,533,613.8	60,540,703.3	227,063,543.8
		Western hemlock	16,865,638.4	612,642.7	2,264,218.5	8,791,474.0	28,533,973.6
		Western white pine	712,055.5	-521,359.2	-197,454.6	4,158,825.6	4,152,067.3
		Engelmann and other spruces	27,843,588.6	1,354,161.8	2,151,130.8	4,664,487.4	36,013,368.6
		Western larch	6,592,905.6	279,666.1	2,682,121.1	6,611,545.6	16,166,238.4
		Lodgepole pine	-109,520,363.9	-424,631.2	1,064,082.4	4,035,351.7	-104,845,560.9
		Western redcedar	34,623,958.4	1,357,841.4	10,617,172.1	27,217,620.0	73,816,592.0
		Other western softwoods	-4,402,621.9	1,004,807.2	475,677.2	155,835.6	-2,766,301.8
All softwoods			154,861,483.6	18,454,726.7	70,223,758.8	197,701,381.0	441,241,350.1
Hardwood species groups							
	Western hardwood species groups						
		Cottonwood and aspen	3,757,982.3	620,502.2	1,284,885.3	2,520,524.0	8,183,893.8
		Red alder	-173,997.8	133,369.2	105,274.3	395,114.8	459,760.6
		Other western hardwoods	-370,647.3	173,893.6	11,634.5	1,102,890.7	917,771.5
All hardwoods			3,213,337.3	927,765.0	1,401,794.1	4,018,529.5	9,561,425.9
All species groups			**158,074,820.9**	**19,382,491.7**	**71,625,552.9**	**201,719,910.5**	**450,802,776.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B25—Average annual mortality of trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by owner class and forest land status, Idaho, 2006-2015.

		Unreserved forests			Reserved forests			All
Owner class		Timberland	Unproductive	Total	Productive	Unproductive	Total	forest land
Forest Service								
	National forest	562,535,122.0	16,681,984.0	579,217,106.0	251,037,217.0	4,679,962.0	262.1	834,934,285.0
Other Federal								
	National Park Service	- -	- -		124,428.0	- -	124,428.0	124,428.0
	Bureau of Land Management	8,076,994.0	4,484,868.0	12,561,862.0	- -	- -	- -	12,561,862.0
	Departments of Defense and Energy	281,970.0	-	281,970.0	- -	- -	- -	281,970.0
State and local government								
	State	24,277,962.0	103,715.0	24,381,678.0	386,564.0	- -	386,564.0	24,768,242.0
Private								
	Undifferentiated private	29,615,954.0	69,585.0	29,685,539.0	- -	- -	- -	29,685,539.0
All owners		**624,788,002.0**	**21,340,152.0**	**646,128,154.0**	**251,548,209.0**	**4,679,962.0**	**256,228,172.0**	**902,356,326.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B26—Average annual mortality of trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by forest-type group and stand-size class, Idaho, 2006-2015.

	Stand-size class				
Forest-type group	Large diameter	Medium diameter	Small diameter	Nonstocked	All size classes
Pinyon / juniper group	69,324.0	- -	40,829.0	- -	110,153.0
Douglas-fir group	180,674,465.0	7,264,522.0	20,418,342.0	- -	208,357,329.0
Ponderosa pine group	25,206,487.0	85,303.0	267,641.0	- -	25,559,431.0
Western white pine group	1,557,484.0	- -	47,313.0	- -	1,604,797.0
Fir / spruce / mountain hemlock group	202,835,345.0	19,776,807.0	60,829,717.0	- -	283,441,869.0
Lodgepole pine group	57,630,007.0	35,176,552.0	46,090,779.0	- -	138,897,339.0
Hemlock / Sitka spruce group	29,156,827.0	446,065.0	2,400,153.0	- -	32,003,046.0
Western larch group	5,501,406.0	182,958.0	5,850,076.0	- -	11,534,440.0
Other western softwoods group	5,861,865.0	4,720,572.0	4,881,553.0	- -	15,463,990.0
Elm / ash / cottonwood group	29,970.0	4,484.0	- -	- -	34,455.0
Aspen / birch group	1,296,627.0	1,910,347.0	5,957,423.0	- -	9,164,397.0
Other hardwoods group	11,451.0	- -	- -	- -	11,451.0
Woodland hardwoods group	72,835.0	29,961.0	34,559.0	- -	137,355.0
Nonstocked	- -	- -	- -	176,036,275.0	176,036,275.0
All forest-type groups	**509,904,094.0**	**69,597,571.0**	**146,818,386.0**	**176,036,275.0**	**902,356,326.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B27—Average annual mortality of trees (at least 5 inches d.b.h./d.r.c.), in cubic feet, on forest land by species group and ownership group, Idaho, 2006-2015.

Species group	Ownership group				All owners
	Forest Service	Other Federal	State and local government	Undifferentiated private	
Softwood species groups					
Western softwood species groups					
Douglas-fir	215,150,523.0	2,888,462.0	7,383,792.0	5,467,042.0	230,889,820.0
Ponderosa and Jeffrey pine	28,278,439.0	118,269.0	337,364.0	1,943,593.0	30,677,667.0
True fir	205,070,750.0	1,784,630.0	9,031,442.0	11,815,099.0	227,701,921.0
Western hemlock	5,358,226.0	- -	357,969.0	36,676.0	5,752,870.0
Western white pine	5,577,380.0	759,620.0	1,462,431.0	825,632.0	8,625,063.0
Engelmann and other spruces	54,369,408.0	- -	2,076,059.0	524,893.0	56,970,360.0
Western larch	11,654,233.0	118,692.0	624,583.0	739,994.0	13,137,502.0
Lodgepole pine	261,220,902.0	3,132,889.0	2,725,812.0	5,492,300.0	272,571,903.0
Western redcedar	3,690,811.0	70,228.0	94,172.0	598,984.0	4,454,196.0
Other western softwoods	40,218,921.0	2,730,367.0	121,156.0	171,313.0	43,241,757.0
Other					
Western woodland softwoods	136,438.0	994,229.0	- -	- -	1,130,667.0
All softwoods	830,726,031.0	12,597,387.0	24,214,781.0	27,615,526.0	895,153,725.0
Hardwood species groups					
Western hardwood species groups					
Cottonwood and aspen	2,665,363.0	264,865.0	334,826.0	1,022,675.0	4,287,730.0
Red alder	236,675.0	- -	- -	17,269.0	253,944.0
Other western hardwoods	1,132,865.0	90,069.0	218,634.0	1,026,929.0	2,468,497.0
Other					
Western woodland hardwoods	173,351.0	15,939.0	- -	3,140.0	192,431.0
All hardwoods	4,208,254.0	370,873.0	553,460.0	2,070,013.0	7,202,601.0
All species groups	**834,934,285.0**	**12,968,260.0**	**24,768,242.0**	**29,685,539.0**	**902,356,326.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B28—Average annual mortality of growing stock trees (at least 5 inches d.b.h.), in cubic feet, on timberland by species group and ownership group, Idaho, 2006-2015.

Species group		Ownership group				
		Forest Service	Other Federal	State and local government	Undifferentiated private	All owners
Softwood species groups						
	Western softwood species groups					
	Douglas-fir	129,907,393.0	2,888,462.0	7,134,635.0	5,451,110.0	145,381,600.0
	Ponderosa and Jeffrey pine	19,950,828.0	118,269.0	333,724.0	1,934,171.0	22,336,993.0
	True fir	143,286,453.0	1,724,958.0	8,815,149.0	11,813,148.0	165,639,708.0
	Western hemlock	5,351,595.0	- -	357,969.0	36,676.0	5,746,239.0
	Western white pine	5,577,380.0	759,620.0	1,462,431.0	825,632.0	8,625,063.0
	Engelmann and other spruces	26,421,973.0	- -	2,076,059.0	524,893.0	29,022,925.0
	Western larch	11,622,860.0	118,692.0	624,583.0	739,994.0	13,106,129.0
	Lodgepole pine	189,077,982.0	825,062.0	2,725,812.0	5,471,089.0	198,099,945.0
	Western redcedar	3,624,117.0	70,228.0	94,172.0	596,879.0	4,385,395.0
	Other western softwoods	22,354,632.0	1,498,739.0	121,156.0	171,313.0	24,145,841.0
All softwoods		557,175,213.0	8,004,030.0	23,745,691.0	27,564,905.0	616,489,838.0
Hardwood species groups						
	Western hardwood species groups					
	Cottonwood and aspen	1,849,675.0	260,359.0	231,111.0	936,482.0	3,277,627.0
	Red alder	236,675.0	- -	- -	17,269.0	253,944.0
	Other western hardwoods	868,704.0	90,069.0	218,634.0	1,023,007.0	2,200,414.0
All hardwoods		2,955,054.0	350,427.0	449,745.0	1,976,758.0	5,731,984.0
All species groups		**560,130,266.0**	**8,354,458.0**	**24,195,436.0**	**29,541,663.0**	**622,221,823.0**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic feet. Columns and rows may not add to their totals due to rounding.

Table B29—Aboveground dry weight of all live trees (at least 1 inch d.b.h./d.r.c.), in dry short tons, by owner class and forest land status, Idaho, 2006-2015.

		Unreserved forests			Reserved forests			All
Owner class		Timberland	Unproductive	Total	Productive	Unproductive	Total	forest land
Forest Service								
	National forest	556,223,418	8,862,142	565,085,561	105,132,111	903,029	106,035,140	671,120,700
Other Federal								
	National Park Service	- -	- -	- -	1,059,475	84,028	1,143,503	1,143,503
	Bureau of Land Management	19,796,936	2,473,386	22,270,322	475,661	- -	475,661	22,745,983
	Other Federal	3,120,034	184,655	3,304,689	- -	- -	- -	3,304,689
State and local government								
	State	50,502,224	882,415	51,384,639	486,705	- -	486,705	51,871,344
Private								
	Undifferentiated private	96,787,514	2,189,308	98,976,822	- -	- -	- -	98,976,822
All owners		**726,430,127**	**14,591,906**	**741,022,033**	**107,153,952**	**987,057**	**108,141,009**	**849,163,041**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the aboveground tree biomass rounds to less than 1 thousand dry tons. Columns and rows may not add to their totals due to rounding.

Table B30—Aboveground dry weight of all live trees (at least 1 inch d.b.h./d.r.c.), in dry short tons, on forest land by species group and diameter class, Idaho, 2006-2015.

Species group			Diameter class (inches)															All classes
			1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+	
Softwood species groups																		
	Western softwood species groups																	
		Douglas-fir	1,177,504	3,139,346	6,809,070	12,697,597	19,488,635	26,457,135	30,867,323	33,015,820	29,146,332	27,447,626	22,841,858	18,344,130	14,326,129	10,806,545	27,228,572	283,793,623
		Ponderosa and Jeffrey pine	108,121	297,868	613,240	1,181,352	1,743,538	2,259,376	3,512,114	3,603,282	4,274,059	4,721,606	4,930,528	4,286,158	5,151,752	3,861,632	14,273,093	54,817,720
		True fir	3,093,401	7,104,563	12,741,688	17,017,255	20,431,667	21,403,402	22,516,906	20,989,857	19,838,070	15,317,408	14,114,840	10,253,923	7,045,285	4,743,504	17,503,369	214,115,137
		Western hemlock	307,734	815,214	948,049	1,686,250	2,141,187	2,409,303	2,508,896	2,223,491	2,060,663	1,182,305	1,510,062	1,880,771	888,271	955,375	1,869,746	23,387,318
		Western white pine	60,319	191,356	225,659	383,832	348,878	536,758	566,661	450,414	655,458	351,829	306,931	566,134	295,160	460,970	265,172	5,665,531
		Engelmann and other spruces	229,195	769,067	1,497,385	2,603,739	3,319,115	4,731,678	5,825,672	5,849,248	6,396,035	5,735,109	5,670,806	4,441,970	3,298,624	2,619,113	7,761,471	60,748,228
		Western larch	96,520	256,764	668,423	1,450,851	2,783,810	3,344,235	3,719,044	3,936,773	2,915,058	2,753,679	2,413,018	1,360,545	1,044,715	1,013,534	2,555,979	30,312,947
		Lodgepole pine	1,750,934	5,097,219	9,607,812	16,678,615	17,817,985	13,263,683	8,877,895	4,883,079	2,197,844	1,427,540	676,004	-	38,582	-	-	82,317,193
		Western redcedar	732,056	1,357,569	2,250,320	2,319,489	2,818,929	3,349,668	2,865,644	2,968,687	3,346,594	2,523,635	2,391,186	2,266,690	1,897,402	1,725,924	12,089,629	44,903,420
		Other western softwoods	311,771	787,881	1,144,942	2,146,704	2,655,495	2,870,729	3,071,013	2,416,165	3,119,003	2,103,674	2,556,124	1,841,950	565,365	930,111	2,331,423	28,852,351
	Other																	
		Western woodland softwoods	40,770	102,439	134,441	255,746	345,630	389,450	360,685	442,559	329,963	297,308	120,762	103,345	126,727	85,290	183,681	3,318,796
All softwoods			7,908,328	19,919,288	36,641,028	58,421,430	73,894,870	81,015,416	84,691,852	80,779,376	74,279,079	63,861,719	57,532,119	45,345,617	34,678,013	27,201,998	86,062,133	832,232,265
Hardwood species groups																		
	Western hardwood species groups																	
		Cottonwood and aspen	777,609	1,089,957	970,274	1,708,434	1,794,153	1,642,286	636,552	462,338	290,903	286,455	119,884	282,506	145,711	181,583	543,233	10,931,879
		Red alder	9,478	36,320	55,661	61,481	16,937	70,713	26,183	101,015	-	-	-	-	-	-	-	377,789
		Other western hardwoods	95,286	185,782	559,969	621,035	583,146	446,605	91,264	62,648	81,227	-	-	-	-	-	-	2,726,962
	Other																	
		Western woodland hardwoods	639,531	779,515	280,928	345,860	252,705	214,823	143,179	63,789	63,671	79,293	17,553	13,299	-	-	-	2,894,146
All hardwoods			1,521,904	2,091,574	1,866,832	2,736,810	2,646,941	2,374,428	897,178	689,791	435,801	365,749	137,437	295,804	145,711	181,583	543,233	16,930,776
All species groups			**9,430,231**	**22,010,862**	**38,507,860**	**61,158,240**	**76,541,811**	**83,389,843**	**85,589,030**	**81,469,167**	**74,714,880**	**64,227,468**	**57,669,556**	**45,641,421**	**34,823,725**	**27,383,581**	**86,605,366**	**849,163,041**

All table cells without observations in the inventory sample are indicated by --. Table value of 0 indicates the aboveground tree biomass rounds to less than 1 thousand dry tons. Columns and rows may not add to their totals due to rounding.

Table B31—Area of accessible forest land, in thousand acres, by Forest Survey Unit, county, and forest land status, Idaho, 2005-2014.

Inventory unit and coun	Timberland	nproductive	Total	Productive	nproductive	Total	forest land
Northern							
Benewah	393.6	- -	393.6	5.6	- -	5.6	399.2
Bonner	968.5	- -	968.5	- -	- -	- -	968.5
Boundary	684.2	23.5	707.7	- -	- -	- -	707.7
Clearwater	1,389.5	- -	1,389.5	- -	- -	- -	1,389.5
Idaho	2,402.3	21.8	2,424.0	1,905.7	24.9	1,930.6	4,354.7
Kootenai	576.4	8.0	584.4	- -	- -	- -	584.4
Latah	367.9	- -	367.9	- -	- -	- -	367.9
Lewis	77.3	- -	77.3	6.6	- -	6.6	83.9
Nez Perce	113.5	- -	113.5	- -	- -	- -	113.5
Shoshone	1,555.7	6.2	1,561.9	18.6	- -	18.6	1,580.5
Total	8,528.9	59.4	8,588.3	1,936.6	24.9	1,961.5	10,549.7
Southwestern							
Ada	5.8	- -	5.8	- -	- -	- -	5.8
Adams	473.8	- -	473.8	23.7	- -	23.7	497.6
Boise	802.2	13.1	815.4	36.7	- -	36.7	852.1
Elmore	451.4	26.5	477.8	43.5	- -	43.5	521.4
Gem	41.9	- -	41.9	- -	- -	- -	41.9
Owyhee	204.6	153.6	358.2	17.9	- -	17.9	376.0
Valley	1,397.0	18.3	1,415.3	614.7	27.5	642.2	2,057.5
Washington	93.6	- -	93.6	-	- -	- -	93.6
Total	3,470.3	211.5	3,681.8	736.5	27.5	764.1	4,445.9

(Table B31 continued)

	Unreserved forests			Reserved forests			All
Inventory unit and coun	Timberland	nproductive	Total	Productive	nproductive	Total	forest land
Southeastern							
Bannock	76.6	77.7	154.2	- -	- -	- -	154.2
Bear Lake	142.3	28.2	170.5	- -	- -	- -	170.5
Bingham	32.5	33.5	65.9	- -	- -	- -	65.9
Blaine	255.9	16.3	272.2	52.4	- -	52.4	324.6
Bonneville	337.5	50.9	388.4	- -	- -	- -	388.4
Butte	78.4	70.8	149.2	- -	5.1	5.1	154.4
Camas	213.7	6.2	219.9	- -	- -	- -	219.9
Caribou	340.5	72.1	412.6	- -	- -	- -	412.6
Cassia	52.3	170.7	223.0	- -	- -	- -	223.0
Clark	202.5	12.2	214.7	- -	- -	- -	214.7
Custer	764.0	127.5	891.4	532.2	22.2	554.4	1,445.8
Franklin	55.6	62.7	118.2	- -	- -	- -	118.2
Fremont	464.0	12.3	476.2	47.3	5.9	53.2	529.4
Jefferson	6.3	- -	6.3	- -	- -	- -	6.3
Lemhi	1,168.4	157.1	1,325.5	370.5	21.7	392.2	1,717.7
Madison	47.5	- -	47.5	- -	- -	- -	47.5
Oneida	33.0	55.6	88.6	- -	- -	- -	88.6
Power	52.5	37.8	90.4	- -	- -	- -	90.4
Teton	94.6	18.2	112.9	- -	- -	- -	112.9
Twin Falls	4.6	10.7	15.2	- -	- -	- -	15.2
Total	4,422.6	1,020.4	5,443.0	1,002.3	54.9	1,057.3	6,500.2
All counties	**16,421.7**	**1,291.3**	**17,713.1**	**3,675.5**	**107.3**	**3,782.8**	**21,495.8**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres. Columns and rows may not add to their totals due to rounding.

Table B32—Area of accessible forest land, in thousand acres, by Forest Survey Unit, county, ownership group, and forest land status, Idaho, 2005-2014.

Inventory unit and county	Forest Service		Other Federal		State and local government		Undifferentiated private		All forest land
	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	
Northern									
Benewah	56.1	--	11.2	--	47.6	5.6	278.7	--	399.2
Bonner	482.5	--	19.8	--	152.7	--	313.4	--	968.5
Boundary	503.6	12.9	6.5	--	59.7	6.5	114.4	4.1	707.7
Clearwater	702.5	--	25.3	--	269.4	--	392.4	--	1,389.5
Idaho	2,044.5	1,946.2	56.7	--	32.5	--	268.5	6.2	4,354.7
Kootenai	226.6	--	18.2	--	25.8	--	305.9	8.0	584.4
Latah	115.9	--	--	--	43.5	--	208.6	--	367.9
Lewis	--	--	--	--	--	6.6	77.3	--	83.9
Nez Perce	--	--	7.8	--	50.1	--	55.6	--	113.5
Shoshone	1,128.8	24.8	51.9	--	62.0	--	313.0	--	1,580.5
Total	5,260.5	1,983.9	197.4	--	743.2	18.7	2,327.7	18.3	10,549.7
Southwestern									
Ada	--	--	--	--	5.7	--	0.1	--	5.8
Adams	351.0	23.7	5.9	--	41.5	--	75.4	--	497.6
Boise	637.1	49.8	17.8	--	77.8	--	69.6	--	852.1
Elmore	413.7	63.8	5.9	--	5.9	6.2	25.9	--	521.4
Gem	40.2	--	--	--	--	--	1.7	--	41.9
Owyhee	--	--	127.5	98.4	56.7	61.1	20.4	12.0	376.0
Valley	1,216.8	660.6	--	--	55.0	--	125.2	--	2,057.5
Washington	79.5	--	--	--	14.1	--	--	--	93.6
Total	2,738.3	798.0	157.1	98.4	256.7	67.3	318.2	12.0	4,445.9

(Table B33 continued)

Inventory unit and county	Forest Service		Other Federal		State and local government		Undifferentiated private		All forest land
	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	Timber-land	Other forest land	
Southeastern									
Bannock	23.2	35.3	19.4	6.5	12.9	6.5	21.0	29.4	154.2
Bear Lake	132.0	28.2	--	--	--	--	10.3	--	170.5
Bingham	--	--	--	6.1	7.6	9.1	24.8	18.3	65.9
Blaine	224.8	68.7	7.4	--	4.4	--	19.3	--	324.6
Bonneville	311.2	38.6	3.6	--	11.2	--	11.5	12.3	388.4
Butte	61.6	41.4	16.8	34.6	--	--	--	--	154.4
Camas	190.5	3.6	10.8	--	6.2	--	6.2	2.6	219.9
Caribou	256.0	41.7	18.9	12.3	34.0	--	31.6	18.1	412.6
Cassia	52.3	55.6	--	78.5	--	6.1	--	30.6	223.0
Clark	190.3	12.2	6.1	--	6.1	--	--	--	214.7
Custer	703.5	651.7	58.9	30.1	1.5	--	--	--	1,445.8
Franklin	53.8	36.7	--	--	1.7	--	--	26.0	118.2
Fremont	444.7	4.6	--	60.9	5.9	--	13.4	--	529.4
Jefferson	--	--	6.3	--	--	--	--	--	6.3
Lemhi	1,087.8	529.2	52.6	10.9	9.3	9.2	18.6	--	1,717.7
Madison	28.2	--	--	--	19.3	--	--	--	47.5
Oneida	19.5	25.5	7.5	19.5	--	--	6.0	10.5	88.6
Power	17.5	--	29.2	6.1	--	--	5.8	31.8	90.4
Teton	73.1	12.5	6.3	--	--	5.7	15.2	--	112.9
Twin Falls	4.6	4.6	--	6.1	--	--	--	--	15.2
Total	3,874.7	1,590.1	243.8	271.4	120.2	36.6	183.9	179.5	6,500.2
All counties	**11,873.4**	**4,372.0**	**598.3**	**369.8**	**1,120.2**	**122.6**	**2,829.8**	**209.7**	**21,495.8**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the acres round to less than 0.1 thousand acres.
Columns and rows may not add to their totals due to rounding.

Table B33—Area of timberland, in thousand acres, by Forest Survey Unit, county, and stand-size class, Idaho, 2005-2014.

Inventory unit and coun		Stand-size class				All size classes
		Large diameter	Medium diameter	Small diameter	Nonstocked	
Northern						
	Benewah	282.7	22.4	86.5	1.9	393.6
	Bonner	642.1	108.4	195.0	23.1	968.5
	Boundary	470.8	87.9	112.7	12.9	684.2
	Clearwater	996.1	123.7	242.7	27.0	1,389.5
	Idaho	1,732.2	208.2	312.6	149.3	2,402.3
	Kootenai	440.9	22.8	86.4	26.3	576.4
	Latah	217.5	28.9	84.0	37.5	367.9
	Lewis	37.1	6.6	13.3	20.3	77.3
	Nez Perce	62.6	27.3	17.4	6.2	113.5
	Shoshone	1,193.5	135.9	216.9	9.3	1,555.7
	Total	6,075.5	772.2	1,367.4	313.8	8,528.9
Southwestern						
	Ada	5.8	- -	- -	- -	5.8
	Adams	343.4	25.2	80.0	25.2	473.8
	Boise	605.5	7.4	99.2	90.1	802.2
	Elmore	268.7	3.2	40.4	139.1	451.4
	Gem	33.5	- -	6.7	1.7	41.9
	Owyhee	132.3	8.1	40.3	23.9	204.6
	Valley	872.9	114.1	204.5	205.4	1,397.0
	Washington	87.9	- -	5.7	- -	93.6
	Total	2,350.0	158.0	476.8	485.4	3,470.3

(Table B33 continued)

Inventory unit and coun		Stand-size class				All size classes
		Large diameter	Medium diameter	Small diameter	Nonstocked	
Southeastern						
	Bannock	60.3	11.5	4.8	- -	76.6
	Bear Lake	94.0	25.8	22.5	- -	142.3
	Bingham	12.2	13.7	6.6	- -	32.5
	Blaine	174.4	13.3	44.5	23.7	255.9
	Bonneville	243.7	37.0	29.7	27.3	337.5
	Butte	68.6	9.7	- -	- -	78.4
	Camas	165.7	15.5	30.9	1.5	213.7
	Caribou	183.2	77.3	78.4	1.6	340.5
	Cassia	37.0	8.5	5.8	1.1	52.3
	Clark	158.3	12.2	26.0	6.1	202.5
	Custer	478.5	106.4	111.0	68.0	764.0
	Franklin	39.9	1.7	13.9	- -	55.6
	Fremont	196.6	115.6	128.9	22.8	464.0
	Jefferson	6.3	- -	- -	- -	6.3
	Lemhi	692.4	174.2	206.1	95.6	1,168.4
	Madison	26.7	10.4	4.5	5.9	47.5
	Oneida	27.0	- -	6.0	- -	33.0
	Power	29.2	11.7	8.8	2.9	52.5
	Teton	57.4	- -	37.2	- -	94.6
	Twin Falls	- -	4.6	- -	- -	4.6
	Total	2,751.3	649.2	765.4	256.7	4,422.6
All counties		**11,176.8**	**1,579.4**	**2,609.6**	**1,056.0**	**16,421.7**

All table cells without observations in the inventory sample are indicated by --.
Table value of 0.0 indicates the acres round to less than 0.1 thousand acres.
Columns and rows may not add to their totals due to rounding.

Table B34—Area of timberland, in thousand acres, by Forest Survey Unit, county, and stocking class, Idaho, 2005-2014.

Inventory unit and coun	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	All classes
			Stocking class of growing-stock trees			
Northern						
Benewah	1.4	116.0	102.2	172.0	1.9	393.6
Bonner	1.5	298.1	364.1	281.6	23.2	968.5
Boundary	9.7	228.6	264.6	167.8	13.5	684.2
Clearwater	3.2	343.9	642.5	373.0	27.0	1,389.5
Idaho	18.7	528.1	948.9	757.4	149.3	2,402.3
Kootenai	6.1	92.1	269.1	176.8	32.4	576.4
Latah	7.8	86.4	119.0	117.2	37.5	367.9
Lewis	--	6.6	6.6	43.7	20.3	77.3
Nez Perce	8.3	--	27.8	71.2	6.2	113.5
Shoshone	12.4	418.9	723.3	391.8	9.3	1,555.7
Total	69.0	2,118.7	3,468.2	2,552.5	320.6	8,528.9
Southwestern						
Ada	--	--	--	5.7	0.1	5.8
Adams	7.4	65.7	202.4	167.2	31.2	473.8
Boise	3.0	74.4	274.4	360.3	90.1	802.2
Elmore	0.1	13.6	123.0	175.5	139.1	451.4
Gem	--	6.7	26.8	6.7	1.7	41.9
Owyhee	8.9	23.8	84.5	63.4	23.9	204.6
Valley	-	108.0	517.3	566.2	205.4	1,397.0
Washington	-	3.1	62.2	28.3	--	93.6
Total	19.5	295.4	1,290.7	1,373.3	491.5	3,470.3

(Table B34 continued)

Inventory unit and coun	Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked	All classes
			Stocking class of growing-stock trees			
Southeastern						
Bannock	--	11.5	31.1	33.9	--	76.6
Bear Lake	3.1	32.2	56.4	45.5	5.2	142.3
Bingham	4.6	8.1	7.6	12.2	--	32.5
Blaine	1.5	50.4	103.2	71.2	29.6	255.9
Bonneville	6.4	49.7	95.0	148.7	37.8	337.5
Butte	2.6	20.4	21.9	29.0	4.5	78.4
Camas	1.6	26.3	114.6	69.7	1.5	213.7
Caribou	3.1	112.7	158.3	64.8	1.6	340.5
Cassia	5.8	27.3	18.2	--	1.1	52.3
Clark	3.0	33.5	86.7	73.1	6.1	202.5
Custer	1.7	126.2	226.4	329.3	80.4	764.0
Franklin	--	8.7	24.3	22.6	--	55.6
Fremont	13.4	55.0	195.2	177.6	22.8	464.0
Jefferson	--	6.3	--	--	--	6.3
Lemhi	17.3	187.7	422.5	423.8	117.0	1,168.4
Madison	4.5	1.5	26.7	8.9	5.9	47.5
Oneida	--	6.0	7.5	19.5	--	33.0
Power	--	21.9	11.7	16.1	2.9	52.5
Teton	--	16.8	45.5	32.3	--	94.6
Twin Falls	--	4.6	--	--	--	4.6
Total	68.4	806.7	1,652.8	1,578.1	316.6	4,422.6
All counties	**156.9**	**3,220.7**	**6,411.7**	**5,503.8**	**1,128.6**	**16,421.7**

All table cells without observations in the inventory sample are indicated by --.
Table value of 0.0 indicates the acres round to less than 0.1 thousand acres.
Columns and rows may not add to their totals due to rounding.

Table B35—Net volume of growing stock trees (at least 5 inches d.b.h.), in million cubic feet, and sawtimber trees, in million board feet (International 1/4 inch rule), on timberland by Forest Survey Unit, county, and major species group, Idaho, 2005-2014.

Inventory unit and county	Growing stock					Sawtimber				
	Major species group					Major species group				
	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
	(In million cubic feet)					(In million board feet)				
Northern										
Benewah	112.7	1,087.3	1.3	--	1,201.3	613.2	5,561.0	--	--	6,174.2
Bonner	260.5	2,385.5	91.7	25.7	2,763.3	1,293.2	11,962.4	226.5	123.0	13,605.1
Boundary	349.3	1,712.2	21.9	13.0	2,096.3	1,535.6	8,625.9	61.9	69.2	10,292.6
Clearwater	483.9	4,198.0	14.7	--	4,696.6	2,341.3	21,567.9	65.1	--	23,974.3
Idaho	1,396.1	6,502.6	15.5	--	7,914.2	7,305.1	35,359.1	39.4	--	42,703.6
Kootenai	234.8	1,329.8	9.9	16.1	1,590.7	1,330.0	7,006.3	22.6	81.7	8,440.6
Latah	140.6	785.8	0.7	--	927.0	714.0	3,913.6	--	--	4,627.6
Lewis	19.9	62.5	--	--	82.4	115.9	255.4	--	--	371.3
Nez Perce	48.6	88.1	--	--	136.6	236.4	412.4	--	--	648.8
Shoshone	619.2	5,112.7	0.3	4.2	5,736.3	2,920.4	26,666.5	--	21.9	29,608.9
Total	3,665.4	23,264.4	155.9	59.0	27,144.7	18,405.2	121,330.5	415.4	295.8	140,446.9
Southwestern										
Ada	2.3	--	--	--	2.3	12.3	--	--	--	12.3
Adams	325.3	933.8	3.0	--	1,262.0	2,015.2	5,230.5	12.4	--	7,258.2
Boise	609.8	861.4	0.7	3.2	1,475.0	4,168.3	4,694.6	--	13.2	8,876.2
Elmore	140.5	422.2	0.8	--	563.5	965.9	2,317.7	3.7	--	3,287.2
Gem	29.5	119.1	--	--	148.6	204.6	792.3	--	--	996.9
Owyhee	--	100.2	0.1	--	100.3	--	453.8	--	--	453.8
Valley	649.0	1,786.4	2.4	--	2,437.8	3,227.0	9,645.9	1.1	--	12,874.1
Washington	51.6	208.3	0.1	--	259.9	343.9	1,237.8	--	--	1,581.6
Total	1,807.8	4,431.3	7.1	3.2	6,249.5	10,937.1	24,372.7	17.2	13.2	35,340.3

(Table B35 continued)

Inventory unit and county	Growing stock					Sawtimber				
	Major species group					Major species group				
	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
	(In million cubic feet)					(In million board feet)				
Southeastern										
Bannock	3.3	128.2	19.0	--	150.4	17.7	696.4	42.4	--	756.5
Bear Lake	26.6	201.0	19.9	--	247.6	110.2	1,039.3	44.7	--	1,194.2
Bingham	0.2	14.8	12.8	--	27.9	--	48.8	21.4	--	70.2
Blaine	20.0	407.0	8.0	--	435.0	77.7	2,011.1	24.7	--	2,113.5
Bonneville	88.2	472.6	60.1	--	620.9	389.4	2,448.5	158.8	--	2,996.7
Butte	4.1	123.5	--	--	127.6	19.4	634.8	--	--	654.3
Camas	31.9	436.9	1.5	--	470.3	122.6	2,385.1	--	--	2,507.7
Caribou	102.1	408.6	89.8	--	600.5	409.1	1,959.7	158.9	--	2,527.6
Cassia	23.8	75.1	4.2	--	103.1	100.0	351.3	--	--	451.3
Clark	44.5	354.9	1.5	--	401.0	215.0	1,918.3	--	--	2,133.3
Custer	158.2	840.3	2.1	3.6	1,004.3	519.3	4,161.5	1.6	2.5	4,684.9
Franklin	11.0	71.6	5.1	--	87.7	57.0	366.9	3.6	--	427.5
Fremont	304.1	288.5	10.3	--	602.9	1,010.3	1,540.7	17.9	--	2,568.9
Jefferson	--	--	28.1	--	28.1	--	--	112.2	--	112.2
Lemhi	531.0	1,208.8	1.4	7.1	1,748.4	1,729.9	5,635.7	5.1	37.6	7,408.3
Madison	32.4	22.4	8.4	--	63.2	153.3	119.4	8.5	--	281.2
Oneida	--	35.8	2.2	--	38.0	--	176.0	1.3	--	177.3
Power	--	76.7	14.7	--	91.4	--	359.5	5.1	--	364.6
Teton	39.1	98.0	6.6	--	143.7	155.8	439.3	8.6	--	603.7
Twin Falls	--	--	11.6	--	11.6	--	--	32.3	--	32.3
Total	1,420.6	5,264.9	307.4	10.7	7,003.6	5,086.6	26,292.2	647.1	40.1	32,066.0
All counties	**6,893.8**	**32,960.6**	**470.4**	**72.9**	**40,397.7**	**34,428.9**	**171,995.3**	**1,079.7**	**349.2**	**207,853.1**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic or board feet. Columns and rows may not add to their totals due to rounding.

Table B36—Average annual net growth of growing stock trees (at least 5 inches d.b.h.), in million cubic feet, and sawtimber trees, in million board feet (International 1/4 inch rule), on timberland by Forest Survey Unit, county, and major species group, Idaho, 2005-2014.

Inventory unit and county	Growing stock					Sawtimber				
	Major species group					Major species group				
	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
	(In million cubic feet)					(In million board feet)				
Northern										
Benewah	1.8	29.5	0.0	--	31.3	16.5	182.3	--	--	198.8
Bonner	5.2	49.6	1.9	0.5	57.1	28.8	300.2	15.9	2.2	347.1
Boundary	-1.4	17.9	0.4	0.1	17.1	22.6	137.5	1.2	0.8	162.0
Clearwater	-1.2	123.9	0.4	--	123.1	17.6	706.9	1.9	--	726.4
Idaho	-36.1	74.0	0.4	--	38.3	-95.6	563.7	1.2	--	469.3
Kootenai	6.2	30.2	0.2	0.2	36.8	41.6	198.1	0.7	1.0	241.4
Latah	1.8	23.6	0.0	--	25.4	14.6	123.4	--	--	138.0
Lewis	0.9	2.2	--	--	3.1	6.6	11.6	--	--	18.2
Nez Perce	1.8	1.1	--	--	2.9	10.9	8.7	--	--	19.6
Shoshone	-0.7	106.7	0.0	0.3	106.3	20.2	688.7	--	1.4	710.2
Total	-21.6	458.6	3.3	1.1	441.4	83.9	2,921.0	20.9	5.3	3,031.0
Southwestern										
Ada	0.1	--	--	--	0.1	1.0	--	--	--	1.0
Adams	7.0	19.1	0.1	--	26.3	52.9	124.9	0.5	--	178.4
Boise	10.6	11.3	0.0	0.1	22.1	79.3	83.0	--	0.3	162.6
Elmore	2.2	-2.9	0.0	--	-0.6	17.3	1.9	0.1	--	19.3
Gem	0.6	0.1	--	--	0.7	5.0	5.0	--	--	10.0
Owyhee	--	1.4	-0.1	--	1.3	--	7.6	-0.3	--	7.2
Valley	-27.2	-36.3	0.1	--	-63.5	-109.9	-107.8	0.0	--	-217.7
Washington	0.6	2.0	0.0	--	2.6	7.0	12.5	--	--	19.5
Total	-6.0	-5.4	0.2	0.1	-11.0	52.6	127.0	0.3	0.3	180.3

(Table B36 continued)

Inventory unit and county	Growing stock					Sawtimber				
	Major species group					Major species group				
	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species
	(In million cubic feet)					(In million board feet)				
Southeastern										
Bannock	0.1	2.2	0.1	--	2.4	0.5	13.0	0.8	--	14.3
Bear Lake	-0.3	4.4	0.3	--	4.4	-0.1	22.7	5.3	--	27.9
Bingham	0.0	0.7	0.3	--	1.0	--	6.0	0.4	--	6.4
Blaine	-3.2	-7.4	-0.1	--	-10.7	-14.0	-27.9	-0.3	--	-42.2
Bonneville	0.9	7.5	1.1	--	9.5	4.9	40.7	4.7	--	50.3
Butte	-0.4	0.7	--	--	0.3	-2.4	6.4	--	--	4.0
Camas	-0.2	1.3	0.1	--	1.1	-2.4	9.6	--	--	7.2
Caribou	2.3	8.8	1.9	--	13.0	8.9	50.7	7.2	--	66.9
Cassia	0.5	1.1	0.2	--	1.8	2.2	8.6	--	--	10.8
Clark	-1.4	4.3	0.1	--	3.1	-7.6	30.6	--	--	23.0
Custer	-31.9	-11.5	0.0	0.2	-43.2	-144.7	-37.4	0.0	0.3	-181.8
Franklin	-1.3	1.6	-0.1	--	0.3	-6.9	8.4	0.0	--	1.6
Fremont	13.0	7.0	0.1	--	20.1	74.3	44.1	-1.3	--	117.1
Jefferson	--	--	0.2	--	0.2	--	--	0.9	--	0.9
Lemhi	-20.6	0.3	0.1	0.3	-20.0	-62.3	24.2	0.1	4.0	-34.0
Madison	0.6	0.6	0.3	--	1.5	7.3	3.4	0.2	--	10.9
Oneida	--	0.9	0.1	--	1.0	--	4.8	1.3	--	6.2
Power	--	2.3	0.4	--	2.7	--	11.4	0.1	--	11.5
Teton	0.7	0.2	0.3	--	1.2	0.8	7.4	-0.4	--	7.8
Twin Falls	--	--	0.2	--	0.2	--	--	2.7	--	2.7
Total	-41.0	25.0	5.3	0.4	-10.2	-141.5	227.0	21.7	4.3	111.5
All counties	**-68.5**	**478.3**	**8.9**	**1.6**	**420.2**	**-5.1**	**3,275.1**	**42.9**	**9.9**	**3,322.8**

All table cells without observations in the inventory sample are indicated by --. Table value of 0.0 indicates the volume rounds to less than 0.1 million cubic or board feet. Columns and rows may not add to their totals due to rounding.

Table B37—Sampling errors by Forest Survey Unit and county for area of timberland, volume, average annual net growth, average annual removals, and average annual mortality on timberland, Idaho, 2005-2014.

Inventory unit and county	Forest area	Timberland area	Growing stock (on timberland)				Sawtimber (on timberland)			
			Volume	Growth	Removals	Mortality	Volume	Growth	Removals	Mortality
Northern										
Benewah	3.45	3.75	12.00	12.62	- -	32.75	13.08	12.89	- -	33.92
Bonner	2.43	2.43	6.98	9.05	- -	14.60	7.93	9.77	- -	18.42
Boundary	3.32	3.78	8.13	31.15	- -	16.01	9.36	22.36	- -	18.52
Clearwater	2.26	2.26	6.16	8.27	- -	15.34	7.00	8.24	- -	16.62
Idaho	1.26	3.62	5.79	43.52	- -	10.43	6.24	19.40	- -	11.59
Kootenai	3.28	3.55	9.23	10.95	- -	20.46	10.16	10.61	- -	23.31
Latah	5.27	5.27	15.84	14.16	- -	26.77	17.22	15.95	- -	30.38
Lewis	15.46	17.58	34.71	28.40	- -	68.94	39.52	29.41	- -	77.28
Nez Perce	15.61	15.61	18.79	73.87	- -	63.81	21.60	59.56	- -	74.08
Shoshone	1.35	1.56	5.10	7.69	- -	11.75	5.75	7.16	- -	13.72
Total	0.79	1.28	2.63	5.33	- -	5.97	2.93	4.53	- -	6.75
Southwestern										
Ada	100.00	100.00	100.00	100.00	- -	- -	100.00	100.00	- -	- -
Adams	4.61	5.19	11.35	15.60	- -	70.52	12.58	13.45	- -	68.57
Boise	3.43	3.93	8.95	13.42	- -	33.59	10.62	11.73	- -	39.34
Elmore	5.67	6.64	13.98	100.00	- -	44.30	15.84	100.00	- -	48.26
Gem	37.32	37.32	48.84	100.00	- -	62.34	50.12	100.00	- -	64.80
Owyhee	9.44	15.62	32.39	45.27	- -	66.90	36.42	43.08	- -	62.20
Valley	1.56	4.03	7.10	30.04	- -	15.55	8.06	44.27	- -	16.63
Washington	16.48	16.48	24.27	56.79	- -	53.95	26.58	44.76	- -	54.71
Total	1.60	2.45	4.65	100.00	- -	13.45	5.31	58.31	- -	14.38

(Table B37 continued)

Inventory unit and county	Forest area	Timberland area	Growing stock (on timberland)				Sawtimber (on timberland)			
			Volume	Growth	Removals	Mortality	Volume	Growth	Removals	Mortality
Southeastern										
Bannock	11.29	21.65	27.60	33.51	- -	69.00	30.14	28.16	- -	- -
Bear Lake	7.07	9.90	20.64	19.15	- -	47.03	23.74	23.71	- -	68.65
Bingham	27.30	39.23	49.03	53.61	- -	100.00	56.27	66.39	- -	- -
Blaine	6.17	9.56	15.91	64.89	- -	38.85	16.74	89.51	- -	45.99
Bonneville	6.47	7.46	11.78	21.80	- -	35.10	12.49	20.98	- -	41.39
Butte	11.43	19.30	28.97	100.00	- -	67.35	29.62	100.00	- -	76.44
Camas	10.57	11.05	18.33	100.00	- -	52.48	20.28	100.00	- -	56.86
Caribou	5.90	7.12	11.50	12.64	- -	50.58	13.59	15.87	- -	88.43
Cassia	12.11	28.24	38.22	46.41	- -	89.17	38.30	40.74	- -	92.73
Clark	9.30	9.34	14.95	44.75	- -	48.66	15.90	39.08	- -	54.36
Custer	2.88	6.63	10.70	18.94	- -	14.79	11.84	22.88	- -	16.42
Franklin	12.91	24.74	29.72	100.00	- -	85.63	32.06	100.00	- -	97.74
Fremont	4.72	6.04	11.04	12.78	- -	30.79	13.20	16.03	- -	37.63
Jefferson	100.00	100.00	100.00	100.00	- -	- -	100.00	100.00	- -	- -
Lemhi	2.48	4.69	7.97	41.18	- -	16.21	9.05	100.00	- -	16.96
Madison	30.91	30.91	39.19	41.20	- -	59.71	41.96	58.37	- -	71.31
Oneida	23.32	40.36	46.79	46.26	- -	- -	45.40	46.43	- -	- -
Power	18.39	16.20	33.51	31.31	- -	- -	40.73	36.51	- -	- -
Teton	9.77	12.89	27.17	85.31	- -	37.19	30.48	75.95	- -	39.76
Twin Falls	58.03	100.00	100.00	100.00	- -	100.00	100.00	100.00	- -	100.00
Total	1.53	2.38	3.88	100.00	- -	9.50	4.34	67.61	- -	10.76
All counties	0.69	1.06	2.02	8.19	- -	5.01	2.28	5.68	- -	5.60

All table cells without observations in the inventory sample are indicated by --. Sampling errors that exceed 100% are reported as 100%.

Appendix C. Idaho Forest-Type Groups and Forest Types, With Descriptions and Timber (T) or Woodland (W) Designations

Forest types are usually named for the predominant species (or group of species) on the condition. In order to determine the forest type, the stocking (site occupancy) of trees is estimated by softwoods and hardwoods. If softwoods predominate, then the forest type will be one of the softwood types and if hardwoods predominate, then the forest type will be one of the hardwood types. Some other special stocking rules apply to individual forest types and are described below.

Associate species are defined as those that regularly form the majority of the non-predominant species stocking of mixed-species conditions. These descriptions are applicable to the current inventory; species importance, including predominance in some cases, will vary for other States or inventory years. When species are listed, they are in decreasing order of overall forest-type stocking.

ALDER/MAPLE GROUP (T)

Red alder

Predominant species: red alder

Associate species: none identified

Other species: western white pine, lodgepole pine, western larch, grand fir

ASPEN/BIRCH GROUP (T)

Aspen

Predominant species: quaking aspen

Associate species: Douglas-fir, subalpine fir, lodgepole pine, Rocky Mountain juniper

Other species: bigtooth maple, curlleaf mountain-mahogany, black cottonwood, whitebark pine, grand fir, western juniper, Utah juniper, western redcedar, Engelmann spruce, paper birch

Paper birch

Predominant species: paper birch

Associate species: Douglas-fir, western redcedar, grand fir, quaking aspen, lodgepole pine, western white pine, western hemlock

Other species: black cottonwood, western larch, Engelmann spruce

DOUGLAS-FIR GROUP (T)

Douglas-fir

Predominant species: Douglas-fir

Associate species: grand fir, subalpine fir, lodgepole pine, ponderosa pine, western larch, western redcedar, quaking aspen

Other species: Engelmann spruce, western white pine, whitebark pine, bigtooth maple, Rocky Mountain juniper, paper birch, limber pine, western hemlock, curlleaf mountain-mahogany, western juniper, black cottonwood, water birch, red alder, mountain hemlock, Pacific yew, Utah juniper

ELM/ASH/COTTONWOOD GROUP (T)

Cottonwood

Predominant species: black cottonwood, narrowleaf cottonwood

Associate species: Douglas-fir, western redcedar, grand fir

Other species: water birch, ponderosa pine, curlleaf mountain-mahogany, western larch, paper birch, lodgepole pine, quaking aspen, western hemlock, subalpine fir, Engelmann spruce, Rocky Mountain juniper

Special rules: Stocking of cottonwoods must be at least 50 percent of total stocking.

FIR/SPRUCE/MOUNTAIN HEMLOCK GROUP (T)

Engelmann spruce

Predominant species: Engelmann spruce

Associate species: subalpine fir, Douglas-fir, grand fir, lodgepole pine, mountain hemlock

Other species: western redcedar, limber pine, western larch, western white pine, western hemlock, whitebark pine, ponderosa pine, quaking aspen, Pacific yew

Special rules: In order to use Engelmann spruce stocking predominance, subalpine fir stocking must be less than 5 percent of the total. Or, if subalpine fir stocking is 5 percent or more, Engelmann spruce stocking must be at least 75 percent of the total.

Engelmann spruce/subalpine fir

Predominant species: subalpine fir, Engelmann spruce

Associate species: lodgepole pine, Douglas-fir, whitebark pine, grand fir, western larch, mountain hemlock

Other species: western redcedar, western hemlock, quaking aspen, western white pine, limber pine, ponderosa pine, black cottonwood, paper birch, Pacific yew

Special rules: The combined stocking of Engelmann spruce with subalpine fir is predominant. Stocking of both Engelmann spruce and subalpine fir must each be between 5 and 74 percent of the total.

Grand fir

Predominant species: grand fir

Associate species: Douglas-fir, western hemlock, western larch, western hemlock, Engelmann spruce, lodgepole pine, ponderosa pine

Other species: western white pine, paper birch, subalpine fir, red alder, Pacific yew, quaking aspen, black cottonwood, mountain hemlock

Mountain hemlock

Predominant species: mountain hemlock

Associate species: subalpine fir, Douglas-fir, lodgepole pine, Engelmann spruce, western larch

Other species: western white pine, grand fir, western hemlock, western redcedar

Subalpine fir

Predominant species: subalpine fir

Associate species: Douglas-fir, lodgepole pine, whitebark pine, Engelmann spruce, quaking aspen

Other species: mountain hemlock, grand fir, western larch, ponderosa pine, subalpine larch, western white pine, western hemlock, black cottonwood, western redcedar, limber pine, Pacific yew, Rocky Mountain juniper

Special rules: In order to use subalpine fir stocking predominance, Engelmann spruce stocking must be less than 5 percent of the total. Or, if Engelmann spruce stocking is 5 percent or more, subalpine fir stocking must be at least 75 percent of the total.

HEMLOCK/SITKA SPRUCE GROUP (T)

Western hemlock

Predominant species: western hemlock

Associate species: western redcedar, grand fir, western larch, Douglas-fir, paper birch, subalpine fir, western white pine

Other species: Engelmann spruce, lodgepole pine, black cottonwood, Pacific yew, ponderosa pine

Western redcedar

Predominant species: western redcedar

Associate species: grand fir, Douglas-fir, western hemlock, western larch

Other species: paper birch, western white pine, lodgepole pine, Engelmann spruce, ponderosa pine, black cottonwood, Pacific yew, subalpine fir, quaking aspen, red alder

LODGEPOLE PINE GROUP (T)

Lodgepole pine

Predominant species: lodgepole pine

Associate species: subalpine fir, Douglas-fir, Engelmann spruce, grand fir, quaking aspen, whitebark pine

Other species: western larch, ponderosa pine, mountain hemlock, western redcedar, western white pine, western hemlock, limber pine, paper birch, Rocky Mountain juniper

NONSTOCKED

Nonstocked

Predominant species: various, most commonly Douglas-fir, but many nonstocked conditions have no live-tree stocking.

Associate species: various

Other species: seldom more than two or three species on a condition. Complete species list: Douglas-fir, lodgepole pine, ponderosa pine, subalpine fir, grand fir, whitebark pine, western juniper, western larch, Engelmann spruce, Utah juniper, limber pine, curlleaf mountain-mahogany, western white pine, paper birch, quaking aspen, western redcedar

Special rules: Used when all live stocking is less than 10 percent. Implies disturbance, but may be used for sparse stands with no disturbance, especially with woodland species.

OTHER WESTERN SOFTWOODS GROUP (T)

Limber pine

Predominant species: limber pine

Associate species: Douglas-fir, Engelmann spruce

Other species: lodgepole pine, curlleaf mountain-mahogany, Utah juniper, whitebark pine

Western juniper

Predominant species: western juniper

Associate species: curlleaf mountain-mahogany, Douglas-fir

Other species: quaking aspen

Special rules: Because diameter is measured at breast height on this juniper species (measured at root collar on other junipers), the forest type is grouped with other western softwoods, rather than with pinyons and junipers.

Whitebark pine

Predominant species: whitebark pine

Associate species: subalpine fir, lodgepole pine, Douglas-fir, Engelmann spruce

Other species: curlleaf mountain-mahogany, Utah juniper, quaking aspen, limber pine

PINYON/JUNIPER GROUP (W)

Juniper woodland

Predominant species: Utah juniper

Associate species: curlleaf mountain-mahogany

Other species: Rocky Mountain juniper

Special rules: Predominance of any combination of junipers other than Rocky Mountain juniper, and live pinyons are NOT present.

Pinyon/juniper woodland

Predominant species: Utah juniper, singleleaf pinyon

Associate species: none encountered

Other species: none

Special rules: Any combination of pinyons and junipers other than Rocky Mountain juniper predominate. Pinyons must be present.

Rocky Mountain juniper

Predominant species: Rocky Mountain juniper

Associate species: curlleaf mountain-mahogany, quaking aspen, Douglas-fir

Other species: bigtooth maple, limber pine

PONDEROSA PINE GROUP (T)

Ponderosa pine

Predominant species: ponderosa pine

Associate species: Douglas-fir, grand fir, lodgepole pine

Other species: western larch, quaking aspen, western white pine, subalpine fir, western redcedar, curlleaf mountain-mahogany, red alder, paper birch, Engelmann spruce, black cottonwood, western hemlock

WESTERN LARCH GROUP (T)

Western larch

Predominant species: western larch

Associate species: Douglas-fir, grand fir, western redcedar, lodgepole pine, paper birch, western hemlock, ponderosa pine, western white pine, subalpine fir

Other species: Engelmann spruce, quaking aspen

WESTERN WHITE PINE GROUP (T)

Western white pine

Predominant species: western white pine

Associate species: grand fir, Douglas-fir, western hemlock, ponderosa pine, lodgepole pine, western larch, western redcedar

Other species: subalpine fir, mountain hemlock, red alder

WOODLAND HARDWOODS GROUP (W)

Cercocarpus (mountain brush) woodland

Predominant species: curlleaf mountain-mahogany

Associate species: Rocky Mountain juniper, Douglas-fir, Utah juniper

Other species: bigtooth maple, ponderosa pine, quaking aspen, lodgepole pine, subalpine fir, limber pine

Special rules: Curlleaf mountain-mahogany is the only species evaluated for this type.

Intermountain maple woodland

Predominant species: bigtooth maple

Associate species: quaking aspen, Rocky Mountain juniper, Douglas-fir, subalpine fir

Other species: curlleaf mountain-mahogany

Special rules: Currently, bigtooth maple is the only species evaluated for this type. In the 1991 periodic inventory, Rocky Mountain maple was included.

Appendix D. Species group, Common Name, Scientific Name, and Categorical Designations for Trees Measured in Idaho's Annual Inventory.

Species group	Common name	Genus	Species	(S)oftwood or (H)ardwood	(T)imber or (W)oodland
Cottonwood and aspen	black cottonwood	*Populus*	*balsamifera*	H	T
	narrowleaf cottonwood	*Populus*	*angustifolia*	H	T
	quaking aspen	*Populus*	*tremuloides*	H	T
Other western hardwoods	paper birch	*Betula*	*papyrifera*	H	T
	water birch	*Betula*	*occidentalis*	H	T
Red alder	red alder	*Alnus*	*rubra*	H	T
Woodland hardwoods	bigtooth maple	*Acer*	*grandidentatum*	H	W
	curlleaf mountain-mahogany	*Cercocarpus*	*ledifolius*	H	W
Douglas-fir	Douglas-fir	*Pseudotsuga*	*menziesii*	S	T
Engelmann and other spruces	Engelmann spruce	*Picea*	*engelmannii*	S	T
Lodgepole pine	lodgepole pine	*Pinus*	*contorta*	S	T
Other western softwoods	limber pine	*Pinus*	*flexilis*	S	T
	mountain hemlock	*Tsuga*	*mertensiana*	S	T
	Pacific yew	*Taxus*	*brevifolia*	S	T
	subalpine larch	*Larix*	*lyallii*	S	T
	western juniper	*Juniperus*	*occidentalis*	S	T
	whitebark pine	*Pinus*	*albicaulis*	S	T
Ponderosa and Jeffrey pines	ponderosa pine	*Pinus*	*ponderosa*	S	T
True fir	grand fir	*Abies*	*grandis*	S	T
	subalpine fir	*Abies*	*lasiocarpa*	S	T
Western hemlock	western hemlock	*Tsuga*	*heterophylla*	S	T
Western larch	western larch	*Larix*	*occidentalis*	S	T
Western redcedar	western redcedar	*Thuja*	*plicata*	S	T
Western white pine	western white pine	*Pinus*	*monticola*	S	T
Woodland softwoods	Rocky Mountain juniper	*Juniperus*	*scopulorum*	S	W
	singleleaf pinyon	*Pinus*	*monophylla*	S	W
	Utah juniper	*Juniperus*	*osteosperma*	S	W

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

Federal Recycling Program Printed on Recycled Paper

To learn more about RMRS publications or search our online titles:
www.fs.fed.us/rm/publications
www.treesearch.fs.fed.us/