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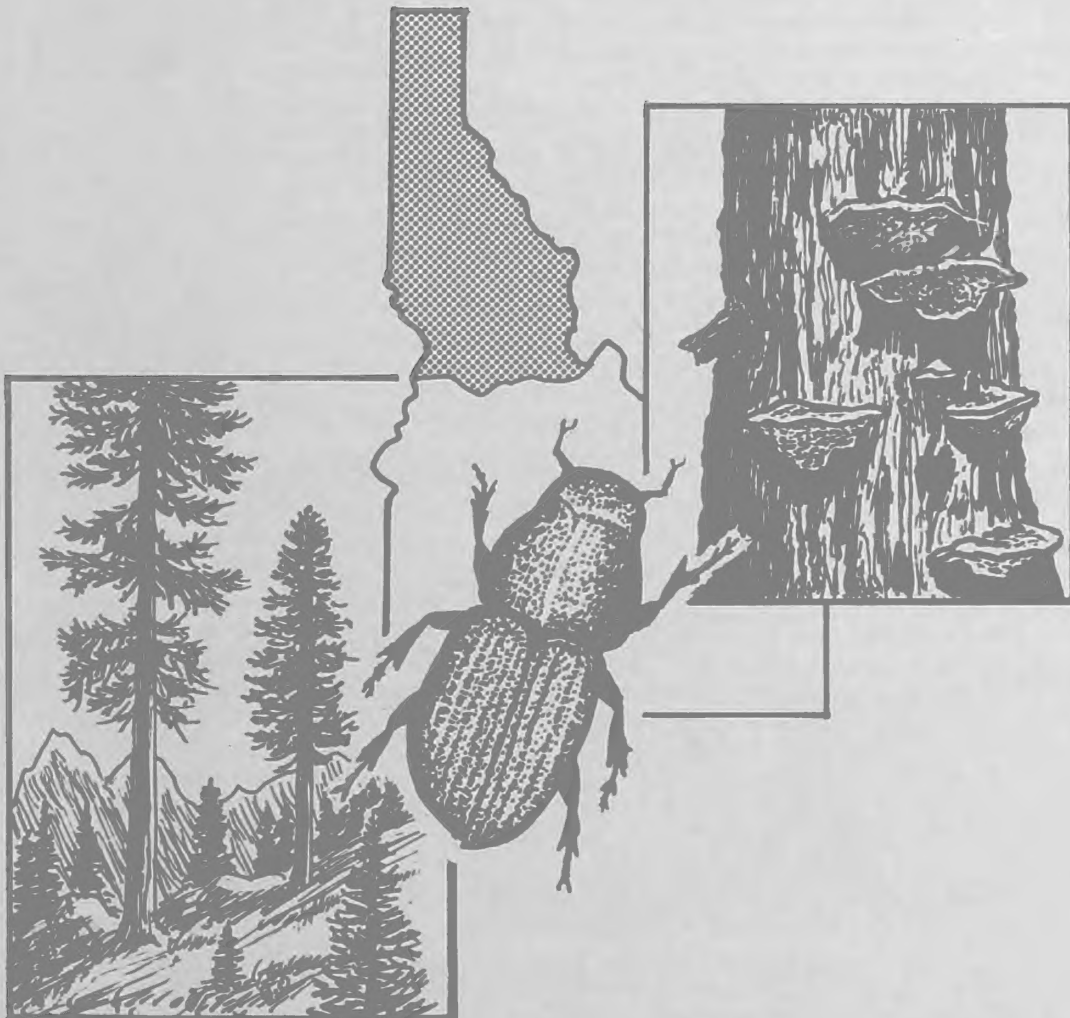
Damage Assessment and Insect and Disease Incidence on Private Forest Land in Northern Idaho

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CH SUMMARY

Northern Idaho private timberlands cover 2.4 million acres, which contain 4,589 million cubic feet of volume. The principal species are Douglas-fir, grand fir, and lodgepole pine. The general condition of the forest is good. An estimated 28 percent of the standing inventory contains damage sufficient to affect either tree vigor or quality, and an additional 2 percent shows evidence of infestation by either insects or diseases but at a level not sufficient to be coded as damage as defined by Forest Survey.

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Damage Assessment and Insect and Disease Incidence on Private Forest Land in Northern Idaho

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INTRODUCTION

The forests of the United States are subject to a wide range of damaging agents including insects, diseases, fire, animals, and mechanical injury due to the actions of weather and people. To assess the impact of these agents on the Nation's timber resources, data on their distribution and abundance are required.

The Forest Survey, whose primary objective is to assess the status of the Nation's forest resources on a State-by-State basis, provides an opportunity to acquire data on the occurrence of forest damage and incidence of insects and diseases. During the 1980 inventory of the forest resources on private lands in northern Idaho, additional information was collected to provide a basis for assessing the potential impact of damage to the forest and the extent of insect and disease incidence. This report summarizes the results of that component of the inventory. Similar data have been collected in conjunction with forest surveys conducted in the southeastern United States with considerable success (Anderson and others 1981).

METHODS

This study was designed to accomplish three objectives. The first was to determine the extent of damage to growing stock by cause; the second was to determine the extent of insect and disease infestation by type of causal agent; and the third was to determine the extent of dwarf mistletoe (*Arceuthobium*) by host species and mistletoe rating.

Damage

By Forest Survey standards, if the damage present on a tree is severe enough to affect the tree's vigor or the quality of its stem, then an appropriate damage code is recorded. If a tree is damaged by more than one agent, the most severe is coded. The guidelines used to determine whether or not damage should be recorded are:

1. If the damage will prevent the tree from living to maturity, or surviving 10 more years if already mature. Example, suppression or severe root rot.
2. If the damage will prevent the tree from producing marketable products. Example, excessive taper or forking.
3. If the damage will reduce or has seriously reduced the quality of products from the tree. Example, heart rot or fire scar.

Altogether, 34 damage classes could be recorded:

Insect	Unidentified insect Bark beetles Defoliators
Disease	Unidentified disease Rusts Rots Blights Mistletoe
Fire	
Animal	Unidentified animal Domestic animal Porcupine girdling Wildlife browse (other than porcupine) Other wildlife damage (trampling and so forth)
Atmosphere	Unidentified weather Wind Lightning Snow Air pollution Chemical Flooding Drought
Other	Suppression Leaning 15° from vertical Forked/multiple stem below merchantable top, seedling/samplings with multiple stems Forked/multiple stem above merchantable top Broken top Dead top Wolf tree Unhealthy foliage Excessive taper Heartwood scar on bole Logging or human damage
	Unidentifiable/ unknown

In all cases, damaging agents are considered independently from those agents that might only result in cubic foot cull deductions. For example, conks—fungal fruiting bodies—on the bole are external signs of internal cull, usually severe, and usually indicate a threat to the vigor, if not to the life, of the tree. As a result, conks would be recorded as damage. Conversely, a small fire scar that results in a small amount of cull probably would not adversely affect the tree and thus would not be recorded as damage even though it did result in a volume deduction.

Insect and Disease Incidence

Most forest trees are susceptible to attack by one or more potentially damaging agents, especially insects or diseases. The severity of these attacks, however, does not always warrant recognition. This could conceivably lead to erroneous conclusions relative to the severity of pathogenic infestations and the resulting impact due to potential resource loss. For example, at the time of the field visit a tree may exhibit signs of bark beetle infestation and yet give the appearance of being a healthy, vigorous tree and thus would not have a damage code indicated. To accommodate this possibility, procedures were developed to make provision for recording the presence of up to two pests even though in the cruiser's judgment these agents were not "damaging" the tree. The procedure identified the following categories of causal agents:

- Bark beetles
- Defoliators
- Stem rusts
- Needle diseases
- Heart rots
- Root diseases

The procedure allowed for recording a primary and secondary causal agent. Thus, if neither was "damaging," it was possible to record up to three agents active on a given tree. If, however, the damage was an insect or disease, the *primary* incidence code would be used to provide detail on the damaging agent.

To assure consistent identification of the various causal agents, personnel from Forest Pest Management (FPM), Forest Service, U.S. Department of Agriculture, conducted a 1-day training session during the prefield orientation. The training included classroom exposure to the various insects and diseases that could occur in northern Idaho. The instructors also took the cruisers to field sites to observe examples of various types of infestations. These were extremely helpful in demonstrating the actual symptoms of insect and disease attack. The difference between some of these symptoms can be subtle. As the field season progressed, FPM specialists periodically visited field crews to answer questions and to provide follow-up training.

Dwarf Mistletoe

In addition to damage and primary and secondary insect and disease incidence, each conifer was given a separate rating for dwarf mistletoe based on Hawksworth's rating system (Hawksworth 1977). This involves dividing

the tree's crown into thirds, evaluating, and coding infection as none = 0, light = 1, heavy = 2, in each third. The ratings are then summed over the entire crown. Thus, a tree's rating can range from 0 for no infection to 6 for heavy infection.

DATA COLLECTION

The field locations selected for measurement during the forest survey of northern Idaho (fig. 1) were taken from a 5,000-m grid distributed across the State. Only privately owned forest lands were sampled, and a portion of the resource information from those lands is reported here. In total, some 700 field locations were visited, and 426, which were permanently established, were found to contain sufficient stocking to qualify as forest. On the forested locations, sample trees were selected using both fixed-radius and variable-radius plots on each point of a 5-point cluster. For trees under 5.0 inches diameter at breast height (d.b.h.) a $1/300$ -acre fixed-area plot was used. Trees 5.0 inches and larger d.b.h. were selected on a variable-radius plot using a 40 basal area factor prism.



Figure 1—Northern Idaho counties.

The area expansion and stratification base came from the photo interpretation or first phase sample of nearly 18,000 points. These points were also systematically distributed across the State on a 1,000-m grid. Where necessary, these points and their associated area equivalent were adjusted to meet known area estimates.

Study data are contained in tables 1 through 25 at the end of this publication.

RESULTS

Northern Idaho had nearly 2.5 million acres of privately owned timberland (Van Hooser 1984). One-third of this area was managed by forest industry, and the remaining two-thirds was controlled by nonindustrial owners such as farmers, ranchers, corporations, and other individuals. On an area basis, the major forest types were Douglas-fir (29 percent), grand fir (23 percent), ponderosa pine (15 percent), western redcedar (11 percent), and lodgepole pine (9 percent). The area supported about 4.6 billion cubic feet of growing stock, including 19.2 billion board feet of sawtimber (International 1/4-inch rule). Much of this volume was in trees that were vigorous and of good form, but just over one-fourth—about 1.3 billion cubic feet—was in trees that were damaged by insects, diseases, or other agents (table 19). Another 89 million cubic feet was contained in trees showing evidence of insect or disease activity or both, and although not yet severe enough to be considered “damage,” the potential for damage to occur was more likely in those trees than in trees that were currently free of infestation.

Mortality

Because trees currently damaged or under attack by pests are more likely to die, a brief examination of current mortality is in order. In total, annual mortality reduced growing-stock inventory by 19 million cubic feet (table 2). The major cause of death was disease, accounting for nearly 43 percent of all mortality. Insects and weather-related damage accounted for an additional 38 percent.

Grand fir (*Abies grandis*) accounted for 29 percent of the annual mortality. Disease caused 58 percent of this loss. Disease also caused 94 percent of the mortality in western white pine (*Pinus monticola*). Insects were the major cause of death in ponderosa pine (*Pinus ponderosa*) and reduced its growing-stock volume by 2.2 million cubic feet. Mortality in Douglas-fir (*Pseudotsuga menziesii*) totaled nearly 3.1 million cubic feet with 41 percent due to weather-related damage.

Damage

The volume in damaged trees was equal to 28 percent of the standing inventory. Depending upon the severity of the damaging agent, the volume in these trees may only be marginally usable, making them uneconomical to harvest. In addition, if a tree succumbs, the volume will be lost to mortality. Moreover, damaged trees are reduced in vigor, which ultimately results in a lowering of net annual growth.

Saplings—The majority of the species had from 10 to 38 percent of their saplings damaged (tables 3 through 13). Much of this was attributable to suppression or tree form. Lodgepole pine (*Pinus contorta*) had the most saplings damaged with nearly 38 percent of the trees affected. Western white pine and western larch (*Larix occidentalis*) had more than 20 percent of their saplings damaged, most of this due to suppression and insects.

Poletimber Trees—Damage to poletimber-size trees was mostly attributable to form defect such as forked or multiple stem or forking above merchantable top (tables 3 through 13). This was also the case for the more economically important species such as western white pine, ponderosa pine, Douglas-fir, lodgepole pine, and Engelmann spruce (*Picea engelmannii*). Lodgepole pine poletimber had the highest total associated volume—63.2 million cubic feet—contained in damaged trees. Engelmann spruce poletimber trees were the least frequently damaged.

Sawtimber Trees—Insect and disease damage was of greater importance in some species due to a higher associated volume. Root disease in western redcedar (*Thuja plicata*) and grand fir sawtimber resulted in an extremely high associated volume—over 111 million cubic feet and 115 million cubic feet, respectively, (tables 3 through 13). Additionally, much of the damage to Douglas-fir and western white pine sawtimber was also due to root disease. Western white pine sawtimber also had the highest incidence of stem disease damage, presumably caused by white pine blister rust (*Cronartium ribicola*), with 22 percent of these trees affected containing nearly 34 million cubic feet of associated volume. Grand fir had the highest total associated damage volume in sawtimber—274 million cubic feet. Western white pine had the highest incidence of damage with just over 56 percent of the sawtimber trees affected.

Timberland Hardwoods—Forked or multiple stems accounted for nearly 60 percent of the damage to growing stock and nearly 16 percent of the damage to sawtimber-sized cottonwood (*Populus trichocarpa*) and aspen (*Populus tremuloides*). Unidentified animal damage was the most frequent damaging agent of other species' saplings (table 13).

Even though all species were affected to some degree by damage due to root disease, it was the major damaging agent for seven species. Form defect was a fairly common source of damage in several species. Lodgepole pine and ponderosa pine both had a high incidence of forked or multiple-stem damage, with ponderosa pine having the highest associated volume in sawtimber-size trees—53 million cubic feet—affected by this type of damage.

Insect and Disease Incidence

At some time during the life of the average tree, insects or diseases or both will be present in the wood, foliage, roots, or stem. Insect and disease incidence is important to note, not so much for the present effect it may have on the trees but for the potential or future impact on the timber resource. Much of the associated volume in trees

with insect and disease incidence has the potential to become damage volume or mortality. In an attempt to establish a more complete base for monitoring resource change and condition in future inventories, the presence of insects and diseases was recorded regardless of whether tree form or vigor was affected.

Altogether, some 89 million cubic feet of growing stock in trees showed signs of insect or disease infestation: Grand fir accounted for 30 percent of the growing-stock volume associated with the presence of insects or diseases or both. Western redcedar contributed another 22 percent, and Douglas-fir added 16 percent to the volume of such trees (table 19). Only two coniferous species and the hardwoods showed no presence of insects or diseases.

Saplings—Lodgepole pine had the highest incidence of disease in saplings with over 12 percent of these trees affected (tables 3 through 13). Nearly 9 percent of the western white pine saplings were affected by disease. The only other species with saplings showing incidence of disease were Douglas-fir and grand fir, but here less than 1 percent of the population was affected. No appreciable incidence of insects was found on saplings of other species during this inventory.

Poletimber Trees—The highest incidence of disease in poletimber trees—6.7 percent—was found on western white pine. For all other species less than 1 percent of the poletimber-size trees had an occurrence of disease. Grand fir poletimber had the highest associated volume—1.8 million cubic feet—in trees with disease incidence, followed by Douglas-fir with 1.2 million cubic feet and western redcedar with 1 million cubic feet. Lodgepole pine, western white pine, and ponderosa pine each had less than a million cubic feet of volume in poletimber trees on which disease incidence was recorded. Lodgepole pine was the only species for which incidence of insects was noted, and only 0.4 percent of the poletimber trees were affected. The associated volume contained in these trees amounted to 1.5 million cubic feet.

Sawtimber Trees—The occurrence of disease in sawtimber-size trees was greatest in western white pine with over 5 percent of trees affected (tables 3 through 13). Western redcedar had the next highest incidence rate with over 4 percent diseased. Grand fir sawtimber had the most associated volume related to disease incidence with some 23 million cubic feet. Insect incidence was highest in western hemlock (*Tsuga heterophylla*) sawtimber with nearly 2 percent of these trees infested. Lodgepole pine, ponderosa pine, grand fir, and Douglas-fir were the remaining species having an incidence of insects in sawtimber-size trees. Lodgepole pine, again, had the highest associated volume—2.8 million cubic feet—related to insect incidence. Other timberland species showed no evidence of insects or diseases at the time of this inventory.

Dwarf Mistletoe

Dwarf mistletoe caused serious damage to several species in northern Idaho. In most cases mistletoe is host specific with one species of dwarf mistletoe attacking a single host species. But in all cases the effect is generally the same: the pathogen takes from the tree nutrients necessary for tree growth, thus reducing vigor. If the infestation is severe enough, the tree can be weakened to the point that it may be more susceptible to attack by other pathogens. These in turn may cause the death of the tree, increasing volume lost to mortality.

Of particular concern in northern Idaho was the impact dwarf mistletoe had on western larch, Douglas-fir, lodgepole pine, and, to a lesser extent, ponderosa pine. Western larch, which occupied over 835,000 acres of timberland, had nearly 66,000 acres or 8 percent infested with mistletoe (table 21). This is equivalent to over 2.9 million sapling, poletimber, and sawtimber trees diseased to some degree (table 24). About 3 percent of the 1.7 million acres of Douglas-fir was infested. This is equivalent to 3 million growing-stock trees exhibiting the presence of dwarf mistletoe (table 25). About 2 percent of the 831,000 acres of ponderosa pine and 2 percent of the 535,000 acres of lodgepole pine had some degree of mistletoe infestation (tables 22 and 23).

Douglas-fir had 1 percent of its saplings with a 1 and 2 mistletoe infestation rating. Western larch poletimber had the most infected trees overall with more than 8 percent and the largest percentage of sawtimber trees infected at just over 13 percent. Most of the trees in these two size classes had a dwarf mistletoe rating of 2.

Western larch sawtimber had the highest associated volume—11.3 million cubic feet—impacted by dwarf mistletoe infestation. Douglas-fir had just under 7.5 million cubic feet of volume affected, and lodgepole pine had about 3.6 million cubic feet of sawtimber volume affected. Associated volume in poletimber trees was highest in western larch with just under 4.6 million cubic feet.

Comparison With Known Incidence From the Forest Pest Management Survey

Distribution of certain damaging agents was cross-checked with existing data on the location of known pest outbreaks as determined by aerial and ground detection surveys conducted by the Idaho Department of Lands and the Northern Region Forest Service, U.S. Department of Agriculture, (Livingston and others 1981). In addition, the distribution of western dwarf mistletoe on ponderosa pine was limited in northern Idaho, being confined to the vicinity of Coeur d'Alene and a few isolated locations along the Salmon River (Hawksworth and Wiens 1972). This provided a cross-check between the known distribution of dwarf mistletoe and the distribution as established by this inventory.

Insect and Disease Survey Comparison—In 1981 Livingston and others found only a few scattered outbreaks of mountain pine beetle in northern Idaho, and most of these occurred on National Forests that were not included in the forest survey. One fairly large outbreak was noted, however, just southeast of Lewiston in Lewis County near Soldiers Meadow Reservoir. Another minor outbreak was found near Elk City in Idaho County (fig. 2).

The forest survey also found evidence of mountain pine beetle activity near these locations (fig. 2), indicating that extensive Forest Survey inventories are sensitive enough to detect such outbreaks.

The same is true for dwarf mistletoe on ponderosa pine. Figure 3 displays the known distribution of dwarf mistletoe in northern Idaho and indicates the locations of those field plots that contained ponderosa pine infected with dwarf mistletoe. Both are reasonable representations of one another with the exception of the one location in Idaho County. Here the presence of witches brooms was coded as dwarf mistletoe when in actuality it may have been *Elytroderma* needle rust (*Elytroderma deformans*) or was in fact an isolated incidence of dwarf mistletoe in ponderosa pine.

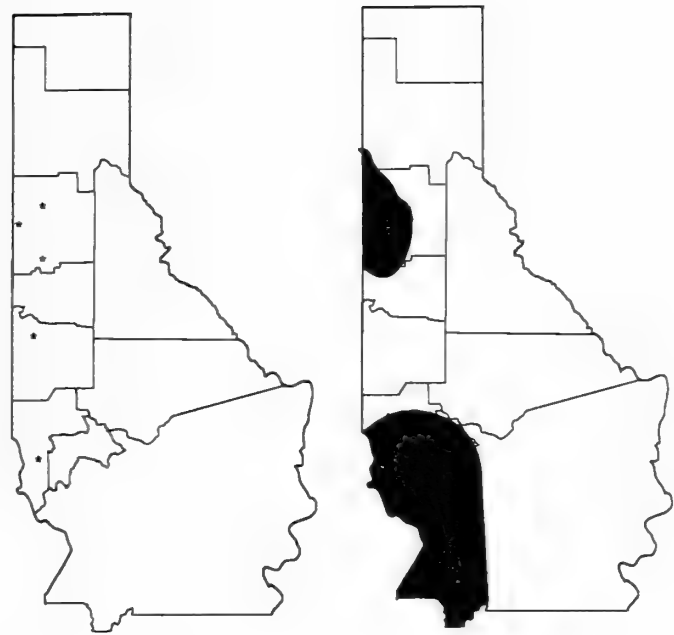


Figure 3—Comparison of Forest Survey findings with zone of occurrence for dwarf mistletoe on ponderosa pine in northern Idaho, 1980.



Figure 2—Comparison of insect and disease aerial survey findings with Forest Survey findings for the occurrence of mountain pine beetle in northern Idaho, 1980.

DISCUSSION

The results of this study show that the privately owned forests in northern Idaho are relatively healthy. Just over one-fourth of the total volume has damage present to a degree that it could affect the tree's vigor or quality. In addition, 2 percent of the inventory volume was contained in trees that were infected with either insects or diseases. This could be directly related to the general health and vigor of the stands in northern Idaho. The average acre here had the potential to produce at least 108 cubic feet annually, which was nearly twice the average for the Rocky Mountains (Green and Van Hooser 1983).

A major benefit of this study was the establishment of a network for monitoring during remeasurement inventories. The most difficult component of change to quantify is mortality. Having an indication of potential loss through current estimates of damage and the presence of insect and disease activity will provide estimates of mortality and measures of cause of death that will be far superior to those generated by previous inventories.

Another benefit of the study is the heightened awareness with regard to insect and disease activity on the part of the field crews. Many pathogens manifest themselves subtly, so much so that they are often missed. A small canker on the upper stem could easily go undetected and yet indicate enough stem defect to literally cull the tree. With intensive training of field crews, many indicators of insects and diseases can be recognized and recorded. Consequently, tree classifications in future inventories will more accurately reflect the health and condition of the forest resource.

FOREST SURVEY TERMINOLOGY

Cull trees—Live trees that are unmerchantable now or prospectively (see Rough trees and Rotten trees).

Cull volume—Portions of a tree's volume that are not usable for wood products because of rot, missing or dead material, or other cubic-foot defect.

Diameter at breast height (d.b.h.)—Diameter of the stem measured at 4.5 feet above the ground.

Diameter at root collar (d.r.c.)—Diameter equivalent at the point nearest the ground line that represents the basal area of the tree stem or stems.

Diameter classes—Tree diameters, either d.b.h. or d.r.c., grouped into 2-inch classes labeled by the midpoint of the class.

Farmer/rancher-owned lands—Lands owned by a person who operates a farm or a ranch and who either does the work or directly supervises the work.

Forest industry lands—Lands owned by companies or individuals operating a primary wood-processing plant.

Forest lands—Lands at least 10 percent stocked by forest trees of any size, including lands that formerly had such tree cover and that will be naturally or artificially regenerated. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelter-belt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if less than 120 feet wide.

Forest trees—Woody plants having a well-developed stem or stems, usually more than 12 feet in height at maturity, with a generally well-defined crown.

Forest type—A classification of forest land based upon and named for the tree species presently forming a plurality of live-tree stocking.

Gross annual growth—The average annual increase in the net volume of trees during a specified period.

Growing-stock trees—Live sawtimber trees, poletimber trees, saplings, and seedlings of timber species meeting specified standards of quality and vigor; excludes cull trees.

Growing-stock volume—Net cubic-foot volume in live poletimber-size and sawtimber-size growing-stock trees from a 1-foot stump to a minimum 4-inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Growth—See definition for Net annual growth.

Hardwood trees—Dicotyledonous trees, usually broad-leaved and deciduous.

Industrial wood—All commercial roundwood products except fuelwood.

Land area—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains, streams, sloughs, estuaries, and canals less than 120 feet wide; and lakes, reservoirs, and ponds less than 1 acre in size.

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

Mortality—The net volume of growing-stock trees that have died from natural causes during a specified period.

National Forest lands—Public lands administered by the Forest Service, U.S. Department of Agriculture.

Net annual growth—Gross annual growth minus average annual mortality.

Net volume in board feet—The gross board-foot volume in the sawlog portion of growing-stock trees, less deductions for cull volume.

Net volume in cubic feet—Gross cubic-foot volume in the merchantable portion of trees less deductions for cull volume. For timber species, volume is computed for the merchantable stem from a 1-foot stump to a minimum 4-inch top diameter outside bark (d.o.b.), or to the point where the central stem breaks into limbs. For woodland species, volume is computed outside bark (o.b.) for all woody material above d.r.c. that is larger than 1.5 inches d.o.b.

Nonforest lands—Lands that do not currently qualify as forest land.

Nonindustrial private—All private ownerships except forest industry.

Nonstocked areas—Forest land less than 10 percent stocked with live trees.

Other private lands—Privately owned lands other than forest industry or farmer-owned.

Other public lands—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture.

Poletimber stands—Stands at least 10 percent stocked with growing-stock trees, in which half or more of the stocking is sawtimber or poletimber trees or both, with poletimber stocking exceeding that of sawtimber (see definition for Stocking).

Poletimber trees—Live trees of timber species at least 5 inches d.b.h. but smaller than sawtimber size.

Potential growth—The average net annual cubic-foot growth per acre at culmination of mean annual growth attainable in fully stocked natural stands.

Reserved forest land—Forest land withdrawn from tree utilization through statute or administrative designation.

Rotten trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with more than half of the cull volume attributable to rotten or missing material.

Rough trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with less than half of the cull volume attributable to rotten or missing material.

Saplings—Live trees of timber species 1 to 4.9 inches d.b.h. or woodland species 1 to 2.9 inches d.r.c.

Sapling and seedling stands—Timberland stands at least 10 percent stocked on which more than half of the stocking is saplings or seedlings or both.

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

Sawlog top—The point on the bole of sawtimber 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 stands—Stands at least 10 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber trees—Live trees of timber species meeting regional size and defect specifications. Softwood trees must be at least 9 inches d.b.h. and hardwood trees 11 inches d.b.h.

Sawtimber volume—Net volume in board feet of the sawlog portion of live sawtimber trees.

Seedlings—Established live trees of timber species less than 1 inch d.b.h. or woodland species less than 1 inch d.r.c.

Softwood trees—Monocotyledonous trees, usually evergreen, having needle or scalelike leaves.

Stand-size classes—A classification of forest land based on the predominant size of trees present (see Sawtimber stands, Poletimber stands, and Sapling and seedling stands).

State, county, and municipal lands—Lands administered by States, counties, and local public agencies, or lands leased by these governmental units for more than 50 years.

Stocking—An expression of the extent to which growing space is effectively utilized by present or potential growing-stock trees of timber species.

Timberland—Forest land where timber species make up at least 10 percent stocking.

Timber species—Tree species traditionally used for industrial wood products. In the Rocky Mountain States, these include aspen and cottonwood hardwood species and all softwood species except pinyon and juniper.

Upper-stem portion—That part of the main stem or fork of sawtimber trees above the sawlog top to a minimum top diameter of 4 inches outside bark or to the point where the main stem or fork breaks into limbs.

Water—Streams, sloughs, estuaries, and canals more than 120 feet wide, and lakes, reservoirs, and ponds more than 1 acre in size at mean high water level.

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FOREST SURVEY TABLES

Table 1--Area of privately owned timberland by forest type and stand-size class in northern Idaho, 1981

Forest type	Stand-size class				Total
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
	----- Acres -----				
Douglas-fir	509,392	56,510	93,608	49,937	709,447
Western hemlock	70,720	14,311	6,404	--	91,435
Ponderosa pine	241,466	18,043	30,413	89,092	379,014
Western white pine	13,305	4,843	--	5,700	23,848
Lodgepole pine	129,939	58,767	24,551	16,013	229,270
Western larch	60,885	19,709	--	--	80,594
Western redcedar	169,344	13,612	67,578	11,400	261,934
Grand fir	434,207	21,352	95,755	13,193	564,507
Spruce-subalpine fir	52,265	6,910	7,906	--	67,081
Spruce	21,318	--	5,700	--	27,018
Aspen	--	--	5,946	--	5,946
Cottonwood	7,906	--	--	--	7,906
Total	1,710,747	214,057	337,861	185,335	2,448,000

Table 2--Annual mortality of growing stock on privately owned timberland by species and cause of death in northern Idaho, 1980

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Logging	Unknown	
	----- Thousand cubic feet -----								
Douglas-fir	207	937	--	--	1,259	--	--	696	3,099
Ponderosa pine	1,647	--	--	--	192	--	--	313	2,152
Western white pine	182	2,691	--	--	--	--	--	--	2,873
Lodgepole pine	--	502	--	--	--	208	--	--	710
Western larch	1,075	616	--	--	221	--	--	362	2,274
Grand fir	1,786	3,067	--	--	125	--	70	213	5,261
Subalpine fir	--	--	--	--	--	--	--	489	489
Engelmann spruce	--	--	--	--	--	--	--	--	--
Western hemlock	--	--	--	--	--	--	223	282	505
Western redcedar	--	153	--	--	461	--	170	--	784
Total softwoods	4,897	7,966	--	--	2,258	208	463	2,355	18,147
Aspen	--	--	--	--	--	--	--	--	--
Cottonwood	--	--	--	--	--	--	--	545	545
Total hardwoods	--	--	--	--	--	--	--	545	545
All species	4,897	7,966	--	--	2,258	208	463	2,900	18,692

Table 3--Damage and insect and disease incidence and associated volume for lodgepole pine on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			----- Thousand cubic feet -----	
Damaged by:					
Beetle	--	0.3	1.4	763	2,841
Other insect	--	.5	--	1,058	--
Stem disease	10.8	.5	--	1,082	--
Heart disease	2.4	--	--	--	--
Root disease	--	1.0	1.0	2,877	3,839
Other disease	--	.5	.6	1,571	1,196
Mistletoe	--	--	1.0	--	3,550
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	.9	1.3	2,658	3,558
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	--	1.9	--	2,954	--
Unknown	5.4	.5	1.1	2,054	2,899
Leaning tree	2.0	--	.4	--	1,411
Forked or multiple stem	3.9	11.2	14.0	27,756	38,743
Broken top	--	.9	.9	2,507	2,190
Dead top	--	--	.4	--	1,201
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	3.1	4.6	5,533	13,324
Excessive taper	--	.5	--	991	--
Fork above merchantable top	--	3.7	1.5	6,945	3,991
Heartwood scar	--	2.0	2.7	3,453	12,012
Logging	--	.4	--	982	2,583
Total	24.5	27.9	30.9	63,184	93,338
Insect and disease incidence:					
Insect	--	.4	1.4	1,524	2,783
Disease	12.3	.4	1.7	790	5,013
Total	12.3	.8	3.1	2,314	7,796
Total all classes	36.8	28.7	34.0	65,498	101,134

Table 4--Damage and insect and disease incidence and associated volume for ponderosa pine on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	1.3	1.2	522	3,657
Other insect	--	--	--	--	--
Stem disease	3.9	2.0	.3	1,007	1,601
Heart disease	--	--	.1	--	485
Root disease	--	--	.2	--	4,958
Other disease	--	--	.4	--	4,280
Mistletoe	--	--	--	--	--
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	3.1	.3	423	1,496
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	.3	--	955
Snow	--	--	--	--	--
Suppressed S/S	5.7	1.9	.6	390	420
Unknown	--	1.4	1.0	1,072	3,219
Leaning tree	--	4.0	.5	1,558	983
Forked or multiple stem	--	6.9	10.7	1,963	53,351
Broken top	--	4.4	2.1	1,612	6,856
Dead top	5.7	3.4	1.4	732	4,565
Excessively limby	--	--	.6	--	1,077
Unhealthy foliage	--	--	.8	--	2,546
Excessive taper	--	.9	.1	632	1,038
Fork above merchantable top	4.0	4.7	3.5	1,913	11,556
Heartwood scar	--	--	.5	--	3,127
Logging	--	--	2.9	--	8,570
Total	19.3	34.0	27.5	11,824	114,740
Insect and disease incidence:					
Insect	--	--	.7	--	2,585
Disease	--	.9	1.2	446	7,340
Total	--	.9	1.9	446	9,925
Total all classes	19.3	34.9	29.4	12,270	124,665

Table 5--Damage and insect and disease incidence and associated volume for western larch on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	0.6	--	1,311
Other insect	9.0	1.6	--	648	--
Stem disease	--	--	--	--	--
Heart disease	--	--	--	--	--
Root disease	--	--	2.1	--	15,669
Other disease	--	--	.5	--	3,923
Mistletoe	--	5.3	3.9	4,563	11,338
Fire	--	--	2.6	--	10,842
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	--	7.2	--	6,394	--
Unknown	5.5	.8	1.3	1,298	3,318
Leaning tree	3.4	.8	--	961	--
Forked or multiple stem	4.8	2.2	4.6	1,729	13,519
Broken top	--	1.3	.4	1,673	2,175
Dead top	--	--	2.1	--	9,364
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	.9	--	1,128	--
Excessive taper	--	1.4	--	1,108	--
Fork above merchantable top	--	--	--	--	--
Heartwood scar	--	1.9	1.8	764	2,433
Logging	--	--	.5	--	1,764
Total	22.7	23.4	20.4	20,266	75,656
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	--	--	.2	--	1,148
Total	--	--	.2	--	1,148
Total all classes	22.7	23.4	20.6	20,266	76,804

Table 6--Damage and insect and disease incidence and associated volume for Douglas-fir on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	0.2	--	5,343
Other insect	--	--	.3	--	1,630
Stem disease	--	--	--	--	--
Heart disease	--	--	.2	--	3,279
Root disease	1.3	1.8	1.7	3,923	34,344
Other disease	1.7	1.2	1.0	1,974	13,341
Mistletoe	1.9	.8	.4	1,720	7,495
Fire	--	--	.2	--	2,338
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	.2	--	1,454
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	1.0	.4	1,543	5,256
Wind	--	--	--	--	--
Lightning	--	--	.5	--	1,334
Snow	--	--	--	--	--
Suppressed S/S	3.1	3.1	.5	4,823	2,667
Unknown	--	1.5	.6	3,234	5,321
Leaning tree	--	1.2	1.2	1,600	11,077
Forked or multiple stem	.9	5.4	3.5	9,518	28,704
Broken top	2.2	1.5	3.3	2,403	26,354
Dead top	--	.5	.6	1,174	3,628
Excessively limby	--	--	--	--	--
Unhealthy foliage	1.0	.5	.1	829	2,665
Excessive taper	--	--	.4	--	2,876
Fork above merchantable top	--	.8	.7	1,701	5,063
Heartwood scar	3.5	.4	.7	950	6,058
Logging	.9	.5	--	600	1,180
Total	16.5	20.2	16.7	35,992	171,407
Insect and disease incidence:					
Insect	--	--	.1	--	2,326
Disease	.9	.4	1.3	1,236	11,042
Total	.9	.4	1.4	1,236	13,368
Total all classes	17.4	20.6	18.1	37,228	184,775

Table 7--Damage and insect and disease incidence and associated volume for grand fir on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			----- Thousand cubic feet -----	
Damaged by:					
Beetle	--	0.5	0.4	915	2,023
Other insect	0.5	--	.2	--	965
Stem disease	--	--	--	--	--
Heart disease	--	.5	.3	602	8,790
Root disease	.5	1.4	7.4	3,979	115,165
Other disease	1.2	1.6	2.7	3,125	26,573
Mistletoe	--	--	.1	--	613
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	.2	--	861
Unidentified weather	--	--	.6	--	6,184
Wind	--	--	--	--	--
Lightning	--	--	.2	--	2,277
Snow	.5	--	--	--	--
Suppressed S/S	4.9	2.1	.5	1,749	522
Unknown	1.6	1.0	1.1	1,695	5,936
Leaning tree	--	--	.1	--	1,033
Forked or multiple stem	.9	1.8	2.1	1,992	17,582
Broken top	.8	1.8	1.7	2,870	13,354
Dead top	1.2	1.4	1.9	1,521	16,004
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	.7	--	2,219
Excessive taper	--	--	.1	--	888
Fork above merchantable top	.5	1.1	.5	1,518	3,409
Heartwood scar	.3	.9	1.3	299	12,977
Logging	.9	--	2.2	--	11,552
Total	13.8	14.1	24.3	20,265	248,927
Insect and disease incidence:					
Insect	--	--	.1	--	1,802
Disease	.9	.8	1.3	1,847	23,157
Total	.9	.8	1.4	1,847	24,959
Total all classes	14.7	14.9	25.7	22,112	273,886

Table 8--Damage and insect and disease incidence and associated volume for western redcedar on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- <u>Percent</u> -----			-- <u>Thousand cubic feet</u> --	
Damaged by:					
Beetle	--	--	--	--	--
Other insect	1.5	--	0.1	--	1,104
Stem disease	--	--	--	--	--
Heart disease	--	--	.3	--	1,004
Root disease	--	3.0	21.4	3,457	110,779
Other disease	--	2.2	4.4	1,814	20,527
Mistletoe	--	--	--	--	--
Fire	--	--	.7	--	4,304
Unidentified animal	--	--	.3	--	1,175
Domestic animal	--	--	--	--	--
Porcupine	--	--	.3	--	784
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	.1	--	1,043
Snow	--	--	--	--	--
Suppressed S/S	4.0	5.6	--	4,340	--
Unknown	.9	1.6	.9	1,233	2,420
Leaning tree	1.2	1.7	.1	1,243	439
Forked or multiple stem	.8	.9	3.7	915	25,051
Broken top	--	.6	1.8	784	8,894
Dead top	--	1.3	.5	1,180	6,750
Excessively limby	--	--	--	--	--
Unhealthy foliage	2.7	.8	.8	953	3,348
Excessive taper	--	--	.1	--	967
Fork above merchantable top	1.1	--	--	--	--
Heartwood scar	.9	3.7	2.1	4,565	6,962
Logging	--	--	1.7	--	8,571
Total	13.1	21.4	39.3	20,484	204,122
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	--	.8	4.2	962	19,079
Total	--	.8	4.2	962	19,079
Total all classes	13.1	22.2	43.5	21,446	223,201

Table 9--Damage and insect and disease incidence and associated volume for Engelmann spruce on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	--	--	--
Other insect	--	--	0.6	--	1,015
Stem disease	--	--	--	--	--
Heart disease	--	--	--	--	--
Root disease	--	--	10.0	--	9,473
Other disease	--	--	--	--	--
Mistletoe	--	--	--	--	--
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	--	--	--	--	--
Unknown	--	--	--	--	--
Leaning tree	--	--	--	--	--
Forked or multiple stem	9.7	5.5	5.9	1,048	2,859
Broken top	--	--	1.2	--	2,137
Dead top	--	--	.8	--	1,030
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	--	--	--
Excessive taper	--	--	--	--	--
Fork above merchantable top	--	--	--	--	--
Heartwood scar	--	--	--	--	--
Logging	--	--	--	--	--
Total	9.7	5.5	18.5	1,048	16,514
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	--	--	--	--	--
Total	--	--	--	--	--
Total all classes	9.7	5.5	18.5	1,048	16,514

Table 10--Damage and insect and disease incidence and associated volume for western white pine on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			----- Thousand cubic feet -----	
Damaged by:					
Beetle	--	--	9.0	--	2,520
Other insect	--	--	--	--	--
Stem disease	--	11.0	22.0	1,413	33,788
Heart disease	--	--	--	--	--
Root disease	--	--	2.9	--	21,880
Other disease	--	--	--	--	--
Mistletoe	--	--	--	--	--
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	.7	--	2,512
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	18.1	12.7	--	948	--
Unknown	--	--	--	--	--
Leaning tree	--	--	--	--	--
Forked or multiple stem	--	--	4.6	--	3,850
Broken top	--	--	4.1	--	6,289
Dead top	--	12.8	5.8	1,088	18,168
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	1.0	--	1,794
Excessive taper	--	--	--	--	--
Fork above merchantable top	--	16.4	--	1,414	--
Heartwood scar	--	--	.8	--	2,743
Logging	--	--	--	--	--
Total	18.1	52.9	50.9	4,863	93,544
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	8.9	6.7	5.2	504	4,138
Total	8.9	6.7	5.2	504	4,138
Total all classes	27.0	59.6	56.1	5,367	97,682

Table 11--Damage and insect and disease incidence and associated volume for subalpine fir on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	--	--	--
Other insect	--	--	--	--	--
Stem disease	--	--	--	--	--
Heart disease	--	--	--	--	--
Root disease	--	--	10.6	--	8,948
Other disease	--	3.0	2.2	606	2,891
Mistletoe	--	--	--	--	--
Fire	--	--	--	--	--
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	--	--	3.3	--	788
Unknown	--	--	--	--	--
Leaning tree	--	--	--	--	--
Forked or multiple stem	--	--	--	--	--
Broken top	8.8	--	.6	--	1,431
Dead top	--	3.5	2.6	1,253	1,215
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	--	--	--
Excessive taper	--	--	--	--	--
Fork above merchantable top	--	--	--	--	--
Heartwood scar	--	--	--	--	--
Logging	--	--	--	--	--
Total	8.8	6.5	19.3	1,859	15,273
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	--	--	--	--	--
Total	--	--	--	--	--
Total all classes	8.8	6.5	19.3	1,859	15,273

Table 12--Damage and insect and disease incidence and associated volume for western hemlock on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	--	--	--
Other insect	--	1.6	--	590	--
Stem disease	--	--	.4	--	1,188
Heart disease	--	--	--	--	--
Root disease	--	--	8.9	--	19,010
Other disease	--	1.8	.6	1,276	1,925
Mistletoe	--	--	--	--	--
Fire	--	--	3.3	--	2,838
Unidentified animal	--	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	1.8	--	1,174
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	2.1	--	2,599
Unidentified weather	--	--	--	--	--
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	2.4	10.5	--	1,954	--
Unknown	5.0	--	--	--	--
Leaning tree	--	3.1	.9	902	1,356
Forked or multiple stem	--	--	5.1	--	7,004
Broken top	--	2.1	3.3	428	5,924
Dead top	--	--	2.3	--	4,242
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	--	--	--
Excessive taper	--	--	--	--	--
Fork above merchantable top	--	2.6	1.1	476	1,055
Heartwood scar	--	--	7.1	--	12,144
Logging	--	--	--	--	--
Total	7.4	21.7	36.9	5,626	60,459
Insect and disease incidence:					
Insect	--	--	1.6	--	1,581
Disease	--	--	--	--	--
Total	--	--	1.6	--	1,581
Total all classes	7.4	21.7	38.5	5,626	62,040

Table 13--Damage and insect and disease incidence and associated volume for other species on privately owned timberland by type of damage in northern Idaho, 1981

Agent	Incidence of damage			Associated volume	
	Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	----- Percent -----			-- Thousand cubic feet --	
Damaged by:					
Beetle	--	--	1.9	--	709
Other insect	--	--	--	--	--
Stem disease	--	--	--	--	--
Heart disease	--	--	--	--	--
Root disease	--	--	2.7	--	1,180
Other disease	--	--	4.8	--	1,598
Mistletoe	--	--	--	--	--
Fire	--	--	--	--	--
Unidentified animal	5.5	--	--	--	--
Domestic animal	--	--	--	--	--
Porcupine	--	--	--	--	--
Other wildlife	--	--	--	--	--
Wildlife damage	--	--	--	--	--
Unidentified weather	--	--	.9	--	1,104
Wind	--	--	--	--	--
Lightning	--	--	--	--	--
Snow	--	--	--	--	--
Suppressed S/S	--	--	--	--	--
Unknown	--	--	--	--	--
Leaning tree	--	--	--	--	--
Forked or multiple stem	--	60.3	15.5	4,146	10,304
Broken top	--	--	--	--	--
Dead top	--	--	--	--	--
Excessively limby	--	--	--	--	--
Unhealthy foliage	--	--	--	--	--
Excessive taper	--	--	--	--	--
Fork above merchantable top	--	6.0	1.9	949	1,098
Heartwood scar	--	--	2.6	--	1,459
Logging	--	--	--	--	--
Total	5.5	66.3	30.3	5,095	17,452
Insect and disease incidence:					
Insect	--	--	--	--	--
Disease	--	--	--	--	--
Total	--	--	--	--	--
Total all classes	5.5	66.3	30.3	5,095	17,452

Table 14--Number of sapling-size growing-stock trees by damage and insect and disease incidence class and species on privately owned timberland in northern Idaho, 1981

Agent	Lodgepole pine	Ponderosa pine	Western larch	Douglas-fir	Grand fir	Subalpine fir
----- Thousand trees -----						
Damaged by:						
Beetle	--	--	--	--	--	--
Other insect	--	--	1,291	--	608	--
Stem disease	2,661	473	--	--	--	--
Heart disease	595	--	--	--	--	--
Root disease	--	--	--	846	640	--
Other disease	--	--	--	1,052	1,558	--
Mistletoe	--	--	--	1,217	--	--
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	--	--	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	--	--	--
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	682	--
Suppressed S/S	--	691	--	1,939	6,446	--
Unknown	1,330	--	784	--	2,044	--
Leaning tree	484	--	484	--	--	--
Forked or multiple stem	969	--	691	595	1,174	--
Broken top	--	--	--	1,366	1,036	791
Dead top	--	691	--	--	1,573	--
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	--	--	--	640	--	--
Excessive taper	--	--	--	--	--	--
Fork above merchantable top	--	484	--	--	595	--
Heartwood scar	--	--	--	2,208	390	--
Logging	--	--	--	595	1,217	--
Total	6,039	2,339	3,250	10,458	17,963	791
Insect and disease incidence:						
Insect	--	--	--	--	--	--
Disease	3,032	--	--	586	1,203	--
Total	3,032	--	--	586	1,203	--
No damage or insect and disease	15,522	9,643	11,376	52,264	111,561	8,141
Total all classes	24,593	11,982	14,626	63,308	130,727	8,932

(con.)

Table 14 (Con.)

Agent	Engelmann spruce	Western white pine	Western hemlock	Western redcedar	Other species	Total all species
	----- <u>Thousand trees</u> -----					
Damaged by:						
Beetle	--	--	--	--	--	--
Other insect	--	--	--	--	--	1,899
Stem disease	--	--	--	--	--	3,134
Heart disease	--	--	--	--	--	595
Root disease	--	--	--	--	--	1,486
Other disease	--	--	--	1,052	--	3,662
Mistletoe	--	--	--	--	--	1,217
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	484	484
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	--	--	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	--	--	--
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	--	682
Suppressed S/S	--	791	608	2,824	--	13,299
Unknown	--	--	1,281	640	--	6,079
Leaning tree	--	--	--	846	--	1,814
Forked or multiple stem	679	--	--	595	--	4,703
Broken top	--	--	--	--	--	3,193
Dead top	--	--	--	--	--	2,264
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	--	--	--	1,921	--	2,561
Excessive taper	--	--	--	--	--	--
Fork above merchantable top	--	--	--	791	--	1,870
Heartwood scar	--	--	--	640	--	3,238
Logging	1,217	--	--	--	--	3,029
Total	1,896	791	1,889	9,309	484	55,209
Insect and disease incidence:						
Insect	--	--	--	--	--	--
Disease	--	390	--	--	--	5,211
Total	--	390	--	--	--	5,211
No damage or insect and disease	5,083	3,190	23,617	60,433	8,343	309,173
Total all classes	6,979	4,371	25,506	69,742	8,827	369,593

Table 15--Number of pole-timber-size growing-stock trees by damage and insect and disease incidence class and species on privately owned timberland in northern Idaho, 1981

Agent	Lodgepole pine	Ponderosa pine	Western larch	Douglas- fir	Grand fir	Subalpine fir
----- Thousand trees -----						
Damaged by:						
Beetle	103	143	--	--	192	--
Other insect	158	--	278	--	--	--
Stem disease	149	222	--	--	--	--
Heart disease	--	--	--	--	197	--
Root disease	308	--	--	728	564	--
Other disease	156	--	--	492	654	147
Mistletoe	--	--	900	342	--	--
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	304	340	--	--	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	386	--	--
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	--	--
Suppressed S/S	629	206	1,226	1,237	854	--
Unknown	168	151	143	583	403	--
Leaning tree	--	446	136	478	--	--
Forked or multiple stem	3,611	748	384	2,168	763	--
Broken top	297	479	221	611	747	--
Dead top	--	375	--	193	578	166
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	1,010	--	160	188	--	--
Excessive taper	168	101	244	--	--	--
Fork above merchantable top	1,210	513	--	334	472	--
Heartwood scar	636	--	322	151	375	--
Logging	133	--	--	211	--	--
Total	9,040	3,724	4,014	8,102	5,799	313
Insect and disease incidence:						
Insect	136	--	--	--	--	--
Disease	115	103	--	145	323	--
Total	251	103	--	145	323	--
No damage or insect and disease	22,969	7,086	13,049	31,796	35,153	4,439
Total all classes	32,260	10,913	17,063	40,043	41,275	4,752

(con.)

Table 15 (Con.)

Agent	Engelmann spruce	Western white pine	Western hemlock	Western redcedar	Other species	Total all species
----- <u>Thousand trees</u> -----						
Damaged by:						
Beetle	--	--	--	--	--	438
Other insect	--	--	172	--	--	608
Stem disease	--	218	--	--	--	589
Heart disease	--	--	--	--	--	197
Root disease	--	--	--	652	--	2,252
Other disease	--	--	189	472	--	2,110
Mistletoe	--	--	--	--	--	1,242
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	--	--	--	644
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	--	--	386
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	--	--
Suppressed S/S	--	251	1,114	1,211	--	6,728
Unknown	--	--	--	356	--	1,804
Leaning tree	--	--	333	374	--	1,767
Forked or multiple stem	167	--	--	201	1,090	9,132
Broken top	--	--	225	136	--	2,716
Dead top	--	248	--	276	--	1,836
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	--	--	--	181	--	1,539
Excessive taper	--	--	--	--	--	513
Fork above merchantable top	--	322	278	--	108	3,237
Heartwood scar	--	--	--	796	--	2,280
Logging	--	--	333	--	--	677
Total	167	1,039	2,644	4,655	1,198	40,695
Insect and disease incidence:						
Insect	--	--	--	--	--	136
Disease	--	133	--	171	--	990
Total	--	133	--	171	--	1,126
No damage or insect and disease	2,862	798	7,987	16,795	610	143,544
Total all classes	3,029	1,970	10,631	21,621	1,808	185,365

Table 16--Number of sawtimber-size growing-stock trees by damage and insect and disease incidence class and species on privately owned timberland in northern Idaho, 1981

Agent	Lodgepole pine	Ponderosa pine	Western larch	Douglas-fir	Grand fir	Subalpine fir
----- Thousand trees -----						
Damaged by:						
Beetle	187	170	68	98	96	--
Other insect	--	--	--	116	60	--
Stem disease	--	50	--	--	--	--
Heart disease	--	10	--	81	66	--
Root disease	132	32	249	650	1,853	300
Other disease	75	54	57	375	667	62
Mistletoe	128	--	458	161	22	--
Fire	--	--	308	77	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	175	37	--	74	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	48	--
Unidentified weather	--	--	--	167	147	--
Wind	--	--	--	--	--	--
Lightning	--	48	--	179	52	--
Snow	--	--	--	--	--	--
Suppressed S/S	--	91	--	198	122	93
Unknown	149	145	153	228	282	--
Leaning tree	59	71	--	447	16	--
Forked or multiple stem	1,833	1,556	545	1,328	532	--
Broken top	123	303	42	1,278	426	18
Dead top	47	201	250	235	468	72
Excessively limby	--	93	--	--	--	--
Unhealthy foliage	604	113	--	41	184	--
Excessive taper	--	15	--	162	22	--
Fork above merchantable top	194	514	--	270	123	--
Heartwood scar	350	75	214	289	328	--
Logging	104	414	58	18	540	--
Total	4,160	3,992	2,402	6,472	6,054	545
Insect and disease incidence:						
Insect	179	101	--	36	22	--
Disease	224	178	21	513	319	--
Total	403	279	21	549	341	--
No damage or insect and disease	8,557	10,218	9,464	31,376	18,414	2,283
Total all classes	13,120	14,489	11,887	38,397	24,809	2,828

(con.)

Table 16 (Con.)

Agent	Engelmann spruce	Western white pine	Western hemlock	Western redcedar	Other species	Total all species
----- <u>Thousand trees</u> -----						
Damaged by:						
Beetle	--	31	--	--	16	666
Other insect	9	--	--	21	--	206
Stem disease	--	766	24	--	--	840
Heart disease	--	--	--	43	--	200
Root disease	154	101	493	3,342	23	7,329
Other disease	--	--	30	683	41	2,044
Mistletoe	--	--	--	--	--	769
Fire	--	--	181	105	--	671
Unidentified animal	--	--	--	41	--	41
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	99	54	--	439
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	113	--	--	161
Unidentified weather	--	27	--	--	8	349
Wind	--	--	--	--	--	--
Lightning	--	--	--	21	--	300
Snow	--	--	--	--	--	--
Suppressed S/S	--	--	--	--	--	504
Unknown	--	--	--	140	--	1,097
Leaning tree	--	--	50	11	--	654
Forked or multiple stem	91	160	285	582	132	7,044
Broken top	19	142	184	279	--	2,814
Dead top	13	202	128	79	--	1,695
Excessively limby	--	--	--	--	--	93
Unhealthy foliage	--	35	--	119	--	1,096
Excessive taper	--	--	--	22	--	221
Fork above merchantable top	--	--	60	--	17	1,178
Heartwood scar	--	29	392	332	22	2,031
Logging	--	--	97	270	--	1,501
Total	286	1,493	2,136	6,144	259	33,943
Insect and disease incidence:						
Insect	--	--	90	--	--	428
Disease	--	180	--	652	--	2,087
Total	--	180	90	652	--	2,515
No damage or insect and disease	1,242	1,802	3,297	8,836	590	96,079
Total all classes	1,528	3,475	5,523	15,632	849	132,537

Table 17--Net volume of growing stock in poletimber-size trees by damage and insect and disease incidence class and species on privately owned timberland in northern Idaho, 1981

Agent	Lodgepole pine	Ponderosa pine	Western larch	Douglas-fir	Grand fir	Subalpine fir
- - - - - Thousand cubic feet - - - - -						
Damaged by:						
Beetle	763	522	648	--	915	--
Other insect	1,058	--	--	--	--	--
Stem disease	1,083	1,007	--	--	--	--
Heart disease	--	--	--	--	602	--
Root disease	2,877	--	--	3,923	3,979	--
Other disease	1,571	--	--	1,974	3,125	606
Mistletoe	--	--	4,563	1,720	--	--
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	2,658	423	--	--	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	1,543	--	--
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	--	--
Suppressed S/S	2,954	390	6,394	4,823	1,749	--
Unknown	2,054	1,072	1,298	3,235	1,695	--
Leaning tree	--	1,558	961	1,600	--	--
Forked or multiple stem	27,756	1,963	1,729	9,518	1,992	--
Broken top	2,508	1,612	1,673	2,403	2,870	--
Dead top	--	732	--	1,174	1,521	1,253
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	5,533	--	1,128	829	--	--
Excessive taper	991	632	1,108	--	--	--
Fork above merchantable top	6,945	1,913	--	1,701	1,518	--
Heartwood scar	3,454	--	764	950	299	--
Logging	982	--	--	600	--	--
Total	63,187	11,824	20,266	35,993	20,265	1,859
Insect and disease incidence:						
Insect	1,525	--	--	--	--	--
Disease	790	446	--	1,236	1,847	--
Total	2,315	446	--	1,236	1,847	--
No damage or insect and disease	172,562	20,521	65,527	135,999	148,010	22,146
Total all classes	238,064	32,791	85,793	173,228	170,122	24,005

(con.)

Table 17 (Con.)

Agent	Engelmann spruce	Western white pine	Western hemlock	Western redcedar	Other species	Total all species
----- Thousand cubic feet -----						
Damaged by:						
Beetle	--	--	--	--	--	2,848
Other insect	--	--	590	--	--	1,648
Stem disease	--	1,413	--	--	--	3,503
Heart disease	--	--	--	--	--	602
Root disease	--	--	--	3,457	--	14,236
Other disease	--	--	1,276	1,814	--	10,366
Mistletoe	--	--	--	--	--	6,283
Fire	--	--	--	--	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	--	--	--	3,081
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	--	--
Unidentified weather	--	--	--	--	--	1,543
Wind	--	--	--	--	--	--
Lightning	--	--	--	--	--	--
Snow	--	--	--	--	--	--
Suppressed S/S	--	948	1,954	4,340	--	23,552
Unknown	--	--	--	1,233	--	10,587
Leaning tree	--	--	902	1,243	--	6,264
Forked or multiple stem	1,048	--	--	915	4,146	49,067
Broken top	--	--	428	784	--	12,278
Dead top	--	1,088	--	1,180	--	6,948
Excessively limby	--	--	--	--	--	--
Unhealthy foliage	--	--	--	954	--	8,444
Excessive taper	--	--	--	--	--	2,731
Fork above merchantable top	--	1,414	476	--	949	14,916
Heartwood scar	--	--	--	4,565	--	10,032
Logging	--	--	1,047	--	--	2,629
Total	1,048	4,863	6,673	20,485	5,095	191,558
Insect and disease incidence:						
Insect	--	--	--	--	--	1,525
Disease	--	504	--	961	--	5,784
Total	--	504	--	961	--	7,309
No damage or insect and disease	12,187	4,694	34,104	71,048	1,881	688,679
Total all classes	13,235	10,061	40,777	92,494	6,976	887,546

Table 18--Net volume of growing stock in sawtimber-size trees by damage and insect and disease incidence class and species on privately owned timberland in northern Idaho, 1981

Agent	Lodgepole pine	Ponderosa pine	Western larch	Douglas- fir	Grand fir	Subalpine fir
----- Thousand cubic feet -----						
Damaged by:						
Beetle	2,841	3,657	1,311	5,343	2,023	--
Other insect	--	--	--	1,630	965	--
Stem disease	--	1,601	--	--	--	--
Heart disease	--	485	--	3,279	8,790	--
Root disease	3,839	4,958	15,669	34,344	115,165	8,948
Other disease	1,196	4,280	3,923	13,341	26,573	2,892
Mistletoe	3,550	--	11,338	7,495	613	--
Fire	--	--	10,842	2,338	--	--
Unidentified animal	--	--	--	--	--	--
Domestic animal	--	--	--	--	--	--
Porcupine	3,558	1,496	--	1,454	--	--
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	--	--	861	--
Unidentified weather	--	--	--	5,256	6,184	--
Wind	--	--	--	--	--	--
Lightning	--	955	--	1,335	2,277	--
Snow	--	--	--	--	--	--
Suppressed S/S	--	420	--	2,667	522	788
Unknown	2,899	3,219	3,318	5,322	5,936	--
Leaning tree	1,411	983	--	11,078	1,033	--
Forked or multiple stem	38,743	53,351	13,519	28,705	17,582	--
Broken top	2,190	6,856	2,176	26,355	13,354	1,431
Dead top	1,201	4,565	9,364	3,628	16,004	1,215
Excessively limby	--	1,077	--	--	--	--
Unhealthy foliage	13,324	2,546	--	2,665	2,219	--
Excessive taper	--	1,038	--	2,876	888	--
Fork above merchantable top	3,991	11,556	--	5,063	3,409	--
Heartwood scar	12,012	3,127	2,433	6,058	12,977	--
Logging	2,583	8,570	1,764	1,180	11,552	--
Total	93,338	114,740	75,657	171,412	248,927	15,274
Insect and disease incidence:						
Insect	2,783	2,585	--	2,326	1,802	--
Disease	5,013	7,340	1,148	11,042	23,157	--
Total	7,796	9,925	1,148	13,368	24,959	--
No damage or insect and disease	174,903	313,318	250,508	807,691	507,690	45,139
Total all classes	276,037	437,983	327,313	992,471	781,576	60,413

(con.)

Table 18 (Con.)

Agent	Engelmann spruce	Western white pine	Western hemlock	Western redcedar	Other species	Total all species
----- Thousand cubic feet -----						
Damaged by:						
Beetle	--	2,520	--	--	709	18,404
Other insect	1,015	--	--	1,104	--	4,714
Stem disease	--	33,788	1,188	--	--	36,577
Heart disease	--	--	--	1,004	--	13,558
Root disease	9,473	21,880	19,010	110,779	1,180	345,245
Other disease	--	--	1,925	20,527	1,598	76,255
Mistletoe	--	--	--	--	--	22,996
Fire	--	--	2,838	4,304	--	20,322
Unidentified animal	--	--	--	1,175	--	1,175
Domestic animal	--	--	--	--	--	--
Porcupine	--	--	1,174	784	--	8,466
Other wildlife	--	--	--	--	--	--
Wildlife damage	--	--	2,599	--	--	3,460
Unidentified weather	--	2,512	--	--	1,104	15,056
Wind	--	--	--	--	--	--
Lightning	--	--	--	1,043	--	5,610
Snow	--	--	--	--	--	--
Suppressed S/S	--	--	--	--	--	4,397
Unknown	--	--	--	2,420	--	23,114
Leaning tree	--	--	1,356	439	--	16,300
Forked or multiple stem	2,859	3,851	7,004	25,051	10,304	200,969
Broken top	2,137	6,289	5,924	8,894	--	75,606
Dead top	1,030	18,168	4,243	6,750	--	66,168
Excessively limby	--	--	--	--	--	1,077
Unhealthy foliage	--	1,794	--	3,348	--	25,896
Excessive taper	--	--	--	967	--	5,769
Fork above merchantable top	--	--	1,055	--	1,098	26,172
Heartwood scar	--	2,743	12,144	6,963	1,459	59,916
Logging	--	--	3,495	8,571	--	37,715
Total	16,514	93,545	63,955	204,123	17,452	1,114,937
Insect and disease incidence:						
Insect	--	--	1,580	--	--	11,076
Disease	--	4,138	--	19,079	--	70,917
Total	--	4,138	1,580	19,079	--	81,993
No damage or insect and disease	50,518	74,075	81,586	177,368	22,125	2,504,921
Total all classes	67,032	171,758	147,121	400,570	39,577	3,701,851

Table 19--Net cubic volume of growing stock on privately owned timberland by species, damage, and insect and disease incidence in northern Idaho, 1981

	Total	No damage No I & D	Damage	No damage I & D present
- - - - - <u>Thousand cubic feet</u> - - - - -				
Lodgepole pine	514,099	357,576	156,523	10,110
Ponderosa pine	470,773	344,209	126,564	10,371
Western larch	413,109	317,184	92,925	1,148
Douglas-fir	1,165,698	958,295	207,403	14,604
Grand fir	951,699	682,506	269,193	26,806
Western redcedar	493,064	268,458	224,606	20,041
Engelmann spruce	80,267	62,705	17,562	--
Western white pine	181,819	83,412	98,407	4,642
Subalpine fir	84,418	67,285	17,133	--
Western hemlock	187,901	121,816	66,085	1,581
Hardwoods	46,554	24,036	22,518	--
Total	4,589,401	3,287,482	1,298,919	89,303

Table 20--Distribution of damaged trees by species and tree-size class

Species	Total population	Trees damaged		
		Sapling	Poletimber	Sawtimber
- - <u>Thousand trees</u> - -		- - - - - <u>Percent</u> - - - - -		
Lodgepole	69,974	37.9	28.6	33.9
Ponderosa pine	37,382	19.3	35.0	32.1
Western larch	43,357	22.7	23.4	20.5
Douglas-fir	141,749	17.4	20.7	18.2
Grand fir	196,811	14.7	14.8	25.7
Subalpine fir	16,512	8.8	6.5	19.3
Spruce	11,536	9.7	5.5	18.5
Western white pine	9,816	27.0	59.6	56.1
Western hemlock	41,662	7.4	24.8	40.2
Western redcedar	11,483	5.5	66.3	30.3
Total	580,282	170.4	285.2	294.8

Table 21--Proportion of area occupied by host species infected by dwarf mistletoe

Host species	Area occupied	Area infected	Percent of area infected
	- - - - - <u>Acres</u> - - - - -		
Lodgepole pine	534,869.8	10,236.2	1.9
Douglas-fir	1,676,984.7	41,959.1	2.5
Western larch	835,255.0	65,727.6	7.9
Ponderosa pine	830,920.6	15,527.5	1.9
Total	3,878,030.1	133,450.4	3.4

Table 22--Number of lodgepole pine trees on privately owned timberland by dwarf mistletoe rating in northern Idaho, 1981

Mistletoe rating	Tree-size class						Total	
	Saplings		Poletimber		Sawtimber			
	Thousand trees	Percent	Thousand trees	Percent	Thousand trees	Percent		
1	--	--	--	--	114	0.8	114	0.2
2	--	--	98	0.3	219	1.7	318	.5
3	--	--	427	1.3	36	.3	464	.7
4	--	--	--	--	--	--	--	--
5	--	--	--	--	20	.2	20	.0
6	--	--	--	--	--	--	--	--
Not infected	24,593	100.0	31,735	98.4	12,731	97.0	69,059	98.6
Total	24,593	100.0	32,260	100.0	13,120	100.0	69,975	100.0

Table 23--Number of ponderosa pine trees on privately owned timberland by dwarf mistletoe rating in northern Idaho, 1981

Mistletoe rating	Tree-size class						Total	
	Saplings		Poletimber		Sawtimber			
	Thousand trees	Percent	Thousand trees	Percent	Thousand trees	Percent		
1	--	--	278	2.5	13	0.1	291	0.8
2	--	--	--	--	185	1.3	185	.5
3	--	--	--	--	7	.0	7	.0
4	--	--	--	--	7	.0	7	.0
5	--	--	--	--	--	--	--	--
6	--	--	--	--	40	.3	40	.1
Not infected	11,982	100.0	10,636	97.5	14,236	98.3	36,853	98.6
Total	11,982	100.0	10,914	100.0	14,488	100.0	37,383	100.0

Table 24--Number of western larch trees on privately owned timberland by dwarf mistletoe rating in northern Idaho, 1981

Mistletoe rating	Tree-size class						Total	
	Saplings		Poletimber		Sawtimber			
	Thousand trees	Percent	Thousand trees	Percent	Thousand trees	Percent		
1	--	--	271	1.6	185	1.5	456	1.0
2	--	--	767	4.5	367	3.1	1,134	2.6
3	--	--	--	--	343	2.9	343	.8
4	--	--	149	.9	268	2.3	417	1.0
5	--	--	197	1.1	245	2.1	442	1.0
6	--	--	--	--	158	1.3	158	.4
Not infected	14,626	100.0	15,678	91.9	10,321	86.8	40,625	93.2
Total	14,626	100.0	17,062	100.0	11,887	100.0	43,575	100.0

Table 25--Number of Douglas-fir trees on privately owned timberland by dwarf mistletoe rating in northern Idaho, 1981

Mistletoe rating	Tree-size class						Total	
	Saplings		Poletimber		Sawtimber			
	Thousand trees	Percent	Thousand trees	Percent	Thousand trees	Percent		
1	608	1.0	150	0.4	47	0.1	806	0.6
2	608	1.0	--	--	164	.4	772	.5
3	--	--	--	--	75	.2	75	.1
4	--	--	192	.5	283	.7	475	.3
5	--	--	164	.4	77	.2	241	.2
6	--	--	--	--	86	.2	86	.1
Not infected	62,091	98.0	39,538	98.7	37,663	98.2	139,292	98.2
Total	63,307	100.0	40,044	100.0	38,395	100.0	141,747	100.0

Van Hooser, Dwane D.; Ciesla, William M.; Conner, Roger C.
and insect and disease incidence on private forest land in no
INT-67. Ogden, UT: U.S. Department of Agriculture, Forest S
Research Station. 34 p.



Presents information on the general condition and health of northern Idaho's private timberlands. The general condition of the forest was good. About 28 percent of the standing inventory contained damage sufficient to affect tree vigor or quality. About 2 percent of inventory was affected by insects and disease.

KEYWORDS: inventory, volume, dwarf mistletoe

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