ANNUAL SILVICAL REPORT

by

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COLVILLE NATIONAL FOREST

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FOREST TREES OF THE COLVILLE NATIONAL FOREST

The order of the species given and the scientific names are after Sudworth's "Forest Trees of the Pacific Slope."

A "(?)" after a species signifies that its presence is doubtful.

CONIFEROUS TREES

SCIENTIFIC NAME	CHECKLIST COMMON NAME	LOCAL NAME
Pinus monticola	Western White Pine	White Pine
Pinus ponderosa	Western Yellow Pine	Yellow Pine Bull Pine
Pinus contorta	Lodgepole Pine	Black Pine Jack Pine
Larix occidentalis	Western Larch	Tamarack
Larix lyallii (?)	Alpine Larch	Tamarack
Picea engelmanni	Engelmann Spruce	Spruce
Tsuga heterophylla	Western Hemlock	Hemlock
Pseudotsuga taxifolia	Douglas fir or spruce	Red fir
Abies lasiocarpa	Alpine fir	Fir
Abies grandis	Grand or white fir	White fir
Abies amabilis (?)	Amabilis fir	Fir
Thuja plicata	Western red cedar	Cedar
Juniperus scopulorum	Rocky Mt. Red Cedar	- - - -
Juniperus communis	Dwarf juniper	- - - -
Taxus brevifolia	Western yew	- - - -

BROADLEAF TREES

SCIENTIFIC NAME	CHECKLIST COMMON NAME	LOCAL NAME
Salix fluviatilis	Longleaf willow	Willow
Salix cordata mackenzieana	Mackenzie willow	Willow
Salix nuttalli	Nutall willow	Willow
Salix sitchensis	Silky willow	Willow
Populus tremuloides	Aspen	Quaken aspen
Populus trichocarpa	Black cottonwood	Cottonwood
Betula fontinalis	Mountain birch	Cherry birch
Betula occidentalis	Western birch	Paper birch
Alnus rhombifolia	White alder	Alder
Alnus tenuifolia	Mountain alder	Alder
Acer circinatum	Vine maple	Vine maple
Acer glabrum	Dwarf maple	Maple

SHRUBS OF THE COLVILLE NATIONAL FOREST

Sudworth's "Forest Trees of the Pacific Slope", Sargent's "Manual of the Trees of North America", and Piper's "Flora of the State of Washington" were consulted in the preparation of the list of shrubs; and the arrangement is after Piper. A "(?)" means its presence is doubtful. East side means Forest land east of Kettle River range; and west side, west of Kettle River range.

SCIENTIFIC NAME	LOCALITY	COMMON NAME
Juniperus communis	Common high altitude	Juniper
Salix sitchensis	General	Willow
Salix fluviatilis	Curlew, Wash.	Willow
Salix hookeriana	Huckleberry Mt., Rock Cut, Wn.	Willow
Alnus tenuifolia	East side	Alder
Berberis nervosa	General	Oregon grape
Berberis aquifolium	General	Oregon grape
Philadelphus lewisii	Barstow, Wash.	Syringa
Philadelphus gordonianus	East side	Syringa
Opulaster pauciflorus	General	Nine bark
Opulaster opulifolius	General	Nine bark
Schizonotus discolor	East side	Ocean spray
Spiraea cinerascens	West side	- - - -
Rubus macropetalus	Republic, Wash.	Dew berry
Rubus parviflorus	East side	Thimble berry
Rubus strigosus	South Fork, Sherman Creek	Red raspberry
Rubus pedatus	West side	- - - -
Rosa nukana	Kettle Falls, Wn.	Wild rose
Amelanchier florida	East side	Service berry
Amelanchier alnifolia	East side	Service berry
Amelanchier cusickii	Columbia River	Service berry
Crataegus douglasii	East side	Black haw
Crataegus columbiana	East side	Thorn apple
Pyrus sitchensis	Northport, Wn.	Mountain ash
Pyrus occidentalis	East side	Mountain ash
Pyrus diversifolia	Orient, Wn.	Wild crabapple
Prunus demissa	Kettle Falls, Wn.	Choke cherry
Prunus emarginata	Kettle Falls, Wn.	Wild cherry
Rhus glabra occidentalis	Northport, Wn.	Sumac
Rhus toxicodendron	Columbia River	Poison ivy
Acer glabrum	East side	Dwarf maple
Acer circinatum	General	Vine maple
Rhamnus purshiana	Columbia River	Cascara segrada
Rhamnus alnifolia	Republic, Wn.	- - - -
Ceanothus velutinus	East side	Sticky laurel
Ceanothus sanguineus	East side	Buck brush
Echinopanax horridum	South Fork, Sherman Creek	Devil's club
Cornus stolonifera	General	Red osier

Arctostaphylos uva-ursi	General	Kinnikinnick
Cassiope tetragona (?)	Republic, Wn.	- - - -
Cassiope mertensiana	Republic, Wn.	- - - -
Gaultheria ovatifolia	Republic, Wn.	Salal
Gaultheria humifosa	General	Salal
Vaccinium uglinosum	East side	Blue berry
Vaccinium occidentale	East side	Blue berry
Vaccinium macrophyllum	East side	Blue berry
Symphoricarpos racemosus	Orient, Wn.	Snow berry
Sambucus glauca	Deadman Creek	Elderberry
Sambucus callicarpa	Deadman Creek	Elderberry
Artemisia tridentata	West side	Sage brush
Corylus californica	Kettle Falls, Wn.	Hazel
Ribes watsonianum	General	Current
Clematis columbiana	General	Clematis

Types

There are four distinct Forest types on the Colville National Forest, viz.: The Slope or Yellow pine type, the Yellow pine Douglas fir, the Subalpine, and the Lowland type.

Climate, which includes temperature and precipitation, has the greatest influence on type formation. Of the two factors, precipitation exerts the greatest effects on site. Changes in altitude are nothing more than changes in climate. Exposure has a noticeable affect on tree distribution, in that it moves the range of a species either north or south of its true range in a level country. Topography, except as it affects slope and altitude, has a very local influence. Soil and light are side factors of lesser importance in tree distribution.

The yellow pine type covers approximately 91,330 acres or 11% of the area of the Forest. It is the predominant type on the flats and slopes along the Columbia and Kettle rivers and on the south slopes of Deadman and Sherman creeks. West of the Kettle river range and north of range 35, the type occurs mostly on north and west slopes but along the south half line, it occurs on land that is comparatively level. The Forest is open and the trees are straight, well formed and of good quality. The typical soils of this area, removed from streams, are of granitic origin, while along the rivers there is a considerable admixture of sand. At about an elevation of 1200 feet along the larger streams, the yellow pine type is an extremely dry site and contains pure yellow pine, while at higher levels, it becomes moister and other species such as Douglas fir and Western larch creep in. The average annual precipitation for the region as a whole is about 20 inches, but this figure does not show its regularity or irregularity of fall. Along the larger rivers on the east side of the Forest at times in the summer season no rain falls for months at a time, as was instanced in the summer of 1910. The irregularity is even more pronounced in Okanogan County.

Forest fires do a great deal of damage in this type, killing the seedlings completely and damaging the mature trees to a small extent. The absence of grazing on the Forest has done more damage than actual grazing, in that the presence of these dry grasses has increased the fire danger considerably. This is also true for the Douglas fir yellow pine type.

It is firmly believed that a selection system of management will give good results for this type at the present time but when the demand for timber becomes greater, a clean cutting and planting system will produce the surest and quickest returns. In case the former system is adopted, yellow pine should be favored in marking in preference to the Douglas fir and Western larch toward the upper limits of the type. Likewise in stands of Douglas fir and Western larch, the latter should be favored over the former.

Yellow pine reproduction comes up well on lumbered areas where the grass has been kept down by Forest fires while in the moister localities and the denser stands, the Douglas fir reproduction is generally more plentiful. The average age for all stands of this type would approximate to 300 years.

The yellow pine Douglas fir type is the largest of all types and contains approximately 628,684 acres or 76% of the Colville Forest. It is a blending of the Douglas fir of the humid coast region and the yellow pine of the semiarid region to the eastward. The principle species are Douglas fir, western larch, western yellow pine, white fir (A*bies grandis*), and very little white pine. The Douglas fir does not attain such magnificent sizes as it does on the coast but it usually becomes quite large especially where there is plenty of moisture. The western larch becomes such a large size that it will form one of the most important saw timber trees of the future on the Colville Forest. Climate is the chief site factor in the formation of the type and in respect to temperature and soil requirements, it is less exacting than the slope type. In point of topography and altitude, the type in question would range from 2000 to 4500 feet, and in most places the topography is rough. The distribution of Douglas fir and western larch is almost equal in a great many places, but as a whole there is a greater amount of Douglas fir while western larch is more plentiful than western yellow pine. The yellow pine is an index of this type, not because it occurs in greatest numbers, but because it is characteristic. The ground cover consists of nine bark, buckbrush, sticky laurel, ocean spray, pine and bunch grass. Like the mature timber, Douglas fir reproduction occurs in greatest numbers almost everywhere, while western larch is found in the moister situations. Humus is medium in quantity.

Forest fires did more damage in this type than in any other during the preceding summer. Approximately 70,000 acres were burned over, and a great deal of reproduction and timber were destroyed. In mixed stands, in order that the desired species may be favored in marking, the selection system of management is recommended but where the timber is mature, clean cutting in strips with natural reproduction will produce good results. On account of the great abundance of atmospheric and soil moisture present, good soil and equable temperature and that reproduction takes hold quickly and the growth becomes very rapid and rank, natural

reproduction seems best adapted to this region. Lodgepole pine comes down into this type in pure stands on burned over areas and forms a temporary type. The growth attained by the lodgepole pine at lower levels is superior to that attained in the subalpine type – its natural home. The average age of all species would approximate to 250 years.

The Subalpine type occupies 103,340 acres or 12% of the Forest area. It extends from the 4500 foot level up to 7300 feet, and includes all lands on the highest points. Most of it lies on the summit of the Kettle River Range of mountains on the east and Bonaparte Mountain on the west. The Colville Forest has practically speaking no land above the timber line. The principal species are Douglas fir, alpine fir, lodgepole pine, and alpine larch. Lodgepole pine is usually found lower down while alpine fir, Douglas fir, and alpine larch occupy the higher places. The soil is poor and rocky and the growing season shorter than in other types, resulting in a scrubby growth of timber. The forest floor consists of a few inches of debris from the trees, underbrush, and ground cover.

Forest fires have occurred in the type in several places and the ground has been laid bare of all growth, causing some erosion. Where these conditions prevail, broadcasting is advisable, and actual planting where broadcasting is a failure. On account of the inaccessibility and quality of the timber, it seems best not to advocate any system of management at present, but to keep it in its natural state, which makes it valuable as a watershed for the streams below. The age of the trees is much larger than would be supposed, and would approximate to 200 years for all species except lodgepole pine, which is much less. There is a fair amount of reproduction present where fires have not occurred.

The lowland type, though very small in area, has distinctive characteristics which distinguish it from all others and marks it as a separate forest type. It is confined wholly to the Eastside and covers approximately 2500 acres. Of the two climatic factors which have the greatest influence on this type, precipitation undoubtedly is the most important. The soil, a clay overtopped with a thick layer of humus and duff, is always saturated with moisture, except in the driest season. In order of importance, the principle species are western red cedar, Engelmann spruce, western hemlock, and black cottonwood.

Fires sometimes enter the lowland type and do a small amount of damage, but when this is the case, the season is exceptionally dry. A selection system of management seems best adapted to this site and western red cedar should be favored in marking. Reproduction of red cedar takes possession of the ground very quickly and the growth is remarkably fast when comparing it with the eastern variety of the genus. Altitude has very little effect upon this type, for it will be found from 1400 up to 3500 feet. It is never found on the north side of the creek bottom but will cover the south side sometimes for some distance. All other species of the type are held backward by persistency, rapid growth, and tolerance of the western red cedar. The average tree in this type is about a forty foot pole, which would average 150 years in age. The largest stand of timber observed was 25,000 poles on one half section of land. Larger stands than this occur

but they are spread over a larger area. Practically no ground cover occurs on the lowland type.

Silvics

The western yellow pine, the most important saw timber on the Colville National Forest, in respect to quality, attains best growth on south and east slopes and river flats. It reaches a height of 150 feet and a diameter of 48 inches in such a locality, while an average would approximate to a height of 120 feet and a diameter of 36 inches. Some specimens of the species have been estimated which contained from 3500 to 4000 board feet. Lumberman differentiate two kinds of yellow pine in this region – a limby pine, the lumber of which is inferior in quality, called bull pine, and a tree grown in denser stands, the lumber from which is clear, called yellow pine.

In youth the yellow pine develops a long tap root which in later life is reinforced by strong laterals and gives the tree a very firm hold on the soil. On lower elevations, in the densest stands, the form of the crown is columnar while in other locations it becomes rather broad. In marked contrast to its associates, the pine can stand considerable drought and still maintain good growth. In regard to soil, it prefers a granite with an admixture of sand but will also do well on other kinds of soil. It will grow up on high rocky points where it becomes very scrubby in appearance.

Yellow pine is more tolerant than western larch but not as tolerant as Douglas fir. Like Scotch pine its tolerance decreases with age and the quality of the site. It is usually found either in pure stands or in association with Douglas fir, western larch, and western white pine. Abundant seed years occur every three to five years but some seed is produced every year. East of the Kettle River Range of mountains, yellow pine produced practically no seed in 1910, while on the west side a very light crop was produced, probably due to the more favorable site and climate.

Compared to the growth of other species, yellow pine is slower than western larch and faster than Douglas fir in the first years of its growth but later on the growth of yellow pine exceeds that of western larch. It averages a height growth of four inches per year and a diameter growth of twelve hundredths of an inch up to the fifteenth year, then it increases to a height growth of eight inches, a diameter growth of fourteen hundredths of an inch. It is quite certain that yellow pine, while Douglas fir is always defective after it attains a diameter of two feet. The quality of locality has some influence on the soundness. Specimens of yellow pine have been observed that were three hundred and fifty years old.

The agency of greatest destruction to pine seeds is fire and probably the pine squirrels are next in importance. They store up great numbers of seed, all of which are not lost to forestation.

It is firmly believed a little fire is good for yellow pine reproduction in some instances. That is, where there is plenty of light and the grasses have been burnt up by the forest

fires, yellow pine reproduction is usually excellent. Where cattle and sheep have grazed off the grasses, the effect is the same as that of fire. Observations were made on the public lands where fires and grazing occurred periodically, and reproduction was always found good while the contrary is true to unprotected and non-grazed lands in the denser stands. Fire is very destructive to yellow pine reproduction. In nine cases out of ten, fires will kill a seedling. The fire resisting qualities of mature western larch and western yellow pine are about equal, but now and then a mature pine is burned out at the butt – the beginning of which could be traced back probably to a catface.

Western larch is one of the most important tree species on the Colville National Forest. Its optimum growth is reached here. In dense stands, western larch grows into an ideal tree for ties and the like of it cannot be duplicated by any other species. It will produce a clear shaft for a distance from 30 to 40 feet with very little taper, cutting four to five ties to a tree, three to four of which will be firsts. After the tie stage is passed, it develops into saw timber of excellent quality, attaining heights of one hundred to one hundred and eighty feet and diameters from four to five feet. It is even substituted now for the more valuable pine.

Western larch demands soil moisture to attain its best growth and where moisture is lacking, the appearance of the tree usually shows it. The root system is more superficial than western yellow pine and it will not forage to such depths for plant food as the former. In youth in the open, the crown is conical, with limbs almost to the base of the bowl while in denser stands it cleans itself of branches almost to the top, leaving only a bunch of branches which in the summer time give the larch its characteristic appearance.

In the first years of its growth, trees were examined that attained a growth of twelve inches a year in height and twenty-five hundredths of an inch in diameter. Later in the trees life, the height growth would more nearly approximate to seven inches per year, and four-tenths of an inch in diameter. Its fast growth in early life is undoubtedly forced by its intolerance of shade.

Douglas fir of Eastern Washington differs from its western prototype on the coast, in that it does not attain such enormous sizes and develops a corky bark which functions as a moisture retainer. In especially most situations it attains a height of one hundred and forty feet and a diameter of three feet, but the average tree would measure nearer eighty feet and a diameter of twenty inches, breast high. Like the Douglas fir of the coast, the eastern variety has a strong preference for atmospheric moisture and where it is present together with soil moisture, it attains its best growth. Douglas fir stumps have been observed which contained one hundred and eighty to two hundred rings.

From a standpoint of management, red fir is considered most valuable for ties and mining purposes. And from the fact that it has a very persistent faculty of getting possession of the ground and grows up with absolutely no care on any kind of soil, it will be chiefly valuable for ties and mine timbers on the better sites and as ground cover on the poorer. The lumber of Douglas fir usually checks badly.

DANGERS AND DISEASES

The depredations of fungi and other parasites have been studied only to a small extent on the Colville National Forest. An identification of the pine butterfly was made in 1909 by a member of the Forest Service.

Dead yellow pine saw logs are often attacked by the blueing fungus which takes hold very quickly. Logs left in the woods twelve months are sure to be infected by the fungus.

A few yellow pine were found infested with a species of mistletoe (*Razoumofskya campylopoda*), which produces the so called "Witches Broom." It is an entanglement of dwarfed limbs and branches which give the dense leaved broom appearance. It is parasitic in nature and feeds on the cambium layer of live timber. Blooming in early summer, the herb ripens its seed about October and then distribution begins. Each seed inclosed in a pouch, is covered with a tight skin at maturity and the least pressure from external natural agents will cause it to explode and shoot the seed for some distance. Covered with a mucilaginous material, they easily cling to whatever they strike. Impinging on a neighboring yellow pine, the seed germinates and a new growth is begun.

The pine butterfly (*Neaphasia menapia*) was reported from Chewiliken Valley in Okanogan County. A few trees were seen on the poorer sites that were infested with the Menapia but it is believed that the depredations are not extensive.

The "Witches Broom" of western larch (*Razoumofskya douglasii laricisis*) is frequently seen but the *Razoumofskya douglasii* of Douglas fir is far more general throughout the Colville National Forest.

Approved 1-3-11
(Stamped) Fred W. Cleator
Acting Supervisor

The principal commercial species on the Forest are yellow pine (*P. ponderosa*), larch (*L. occidentalis*), red fir (*Pseudotsuga taxifolia*), cedar (*Thuja plicata*), and lodgepole pine. In general the stand is open and all aged and would seem to be best adapted to some form of diameter limit cutting, the limit to be determined according to conditions. The stand is sufficiently open so that trees left after cutting would be windfirm.

While the stand of the younger classes varies, in general they are well represented. On the burns a large part of the reproduction is lodgepole pine though this species forms a small part of the Forest. Since this species is least desirable any cutting should include all merchantable trees of this species. The fir in this region is rather an inferior quality being limby with a moderate quick taper. It is, however, the most valuable wood for ties and firewood. On the north and east slopes cutting should be with the aim of reproducing to larch and fir; on the west and south slopes yellow pine is the most natural tree.

(Ames, F.E., Report on Colville National Forest, August 12, 1907.)