DOWNLOAD PDF NATURAL REGENERATION IN TWO CENTRAL IDAHO GRAND FIR HABITAT TYPES

Chapter 1 : Upper North Fork Roadless Area | Friends of the Clearwater Moscow, Idaho

Get this from a library! Natural regeneration in two central Idaho grand fir habitat types. [Kathleen Geier-Hayes; Intermountain Research Station (Ogden, Utah)].

Rooting Habit- Root systems of mature forest trees, including white fir, have not been the subject of much research. What little is known has been gleaned from observations of windthrown trees. Mature white fir rooting habit appears to be fairly adaptable: There is no strong tendency to maintain a single deep taproot, although rapid taproot development is critical for survival of new germinants in the dry summer climate. White fir is susceptible to windthrow following partial cutting, especially when marginal codominant and lower crown classes are left as the residual stand. Root diseases contribute significantly to lack of windfirmness. Root grafting between firs is common and is frequently demonstrated by living stumps Root grafting is also a factor in the spread of root rots. Effects of mycorrhizal associations are beginning to be explored. Early information indicates that these root and fungi relationships are significant, especially in establishment and early growth on poor sites, and that bare mineral soil promotes the association 6. Reaction to Competition- White fir has several features of major silvicultural significance. The species is classified as shade tolerant, more so than most of its mixed conifer associates Relative shade tolerances of red fir and white fir in the high-elevation burning transition zone are uncertain. In the northern end of their respective ranges, shade tolerance may be affected by the evident exchange of genetic material with associated species-white fir with grand fir A. White fir is capable of rapid growth to a large size and grows best in full sunlight. It can survive for exceptionally long periods as a suppressed tree and still respond to release by increasing growth dramatically. The time period before growth begins to accelerate varies depending on crown condition at time of release Seed production increases following release even on dominant trees Because of these features, white fir is a major management consideration in any mixed conifer stand where it is a component. Partial cutting and most shelterwood cuttings favor white fir and increase its importance in the stand. Prescribed burning in areas where white fir is not desired may be the only reasonable way to control its abundance. Underburning in groves of giant sequoia to control young white firs and to create seedbeds for giant sequoia reproduction is a special example. To manage pure stands of white fir is relatively easy and, with intensive management, young stands can be extremely productive. White fir can be regenerated naturally or artificially. Natural regeneration can be achieved through clearcutting as long as the maximum downwind width of openings does not exceed 1. Shelterwood cuttings have been successful in establishing natural regeneration On sites where brush competition is a problem, planting under shelterwood has promise. Because of high growth rates in dense, even-aged stands, even-aged management is the likely choice. The long period of extremely slow growth under shade and the incidence of dwarf mistletoe infestation make uneven-aged management questionable, however. Damaging Agents- White fir saplings and poles are susceptible to fire damage or kill, but trees become more resistant to both with age and size. White fir is considered more fire resistant than its associated species at high elevations 37,41 , but less resistant than its associates at low elevations Fire scars, commonly found in old-growth stands, provide an entry court for a variety of disease and decay organisms. White fir is sensitive to spring and fall frosts. Spring frosts can kill developing buds as well as foliage. Damage to established trees, other than Christmas trees, is not usually significant. On some sites, repeated damage to new fir growth can give a competitive advantage to more resistant species. Cold damage to mature trees takes the form of frost cracks and ring shake. Frost cracks are associated with some rot and decay loss 9. Sudden rises in temperature during May and early June can cause damage nearly identical to that of spring frosts. Sun-scalding following thinning is rare in mature trees, although young, thin-barked trees are susceptible. When white fir boles are injured, recovery is slow 9. Compared to its associated species, white fir is moderately susceptible to ozone damage. Although fir grows faster than associated species in southern California, diameter growth is affected by oxidant damage as much

as that of Ponderosa pine White fir is more resistant to fluoride damage than Douglas-fir or ponderosa pine As intensive management of this productive species increases, so will the importance of mechanical injury. Studies in Oregon and California have shown that conventional logging techniques for thinning or partial cutting damaged 22 to 50 percent of the residual stand. Seventy-five percent of these wounds were at ground level, where infection by some decay-causing fungus is almost certain 3. Loss of volume by time of final harvest can be considerable. Two parasitic plants, white fir mistletoe Phoradendron bolleanum subsp. In Arizona, Mexico, and the central to southern Sierra Nevada of California, white fir mistletoe is a serious problem on large old trees. Heavy infections cause spike tops, loss of vigor, and increased susceptibility to bark beetle attack. Dwarf mistletoe is a major problem from the southern Sierra Nevada north into Oregon. It is found elsewhere throughout the native range of white fir in coastal and southern California, Nevada, and Arizona 39, One-third of the white fir stands in California are severely infested by dwarf mistletoe and the parasite is present in other forest types that contain white fir. Heavily infected trees suffer significant growth losses and are prone to attack by Cytospora abietis, a fungus that kills branches and further reduces growth. Because of reduced vigor, infected trees are more susceptible to bark beetle attack and various diseases 50, Heart rots, entering through open mistletoe stem cankers, increase mortality of old-growth trees through stem breakage. Changes in wood structure in the large stem bulges caused by dwarf mistletoe infections reduce the strength of lumber produced. Current lumber grading practices, however, are not adequate to identify the affected wood Dwarf mistletoe need not be a problem in young managed stands because three factors make damage subject to silvicultural control. The parasite is host specific: Small trees less than 1 m [3. Infected young firs free from new overstory infection outgrow the spread of mistletoe if height growth is at least 0. Annosus root rot Heterobasidion annosum is present in all conifer stands and may become a major disease problem as management of white fir increases. Once established, the disease affects trees within a slowly expanding, circular infection center. Spread from tree to tree is through root contacts. New infection centers begin by aerial spread of spores and infection of basal wounds and freshly cut stumps. In true fir, annosus root rot usually does not kill directly but produces considerable moisture stress and loss of vigor that predispose the tree to attack by bark beetles, notably Scolytus. Direct damage resulting from infection is restricted primarily to heart rot of butt and major roots, leading to windthrow and stem breakage 9. Some degree of control is available through silvicultural means and use of borax on freshly cut stumps. Other rots of major significance include the yellow cap fungus Pholiota limonella , Indian paint fungus Echindontium tinctorium , and white pocket rot Phellinus pini 9. Yellow cap fungus causes heavy losses from butt rot and enters through fire scars and basal wounds 9. Indian paint fungus is a major heart rot organism. This fungus probably infects fir in the same manner it does western hemlock 3. Entry is through branchlets less than 2 mm 0. The fungus can remain dormant for up to 50 years before being activated by injury to the tree Rot commonly extends 3 m 11 ft below and 6 m 20 ft above each characteristic fruiting body 4. No effective control is known although trees less than 40 years old are relatively free of rot because they have so little heartwood. In the white fir-grand fir complex of Idaho, the fungus was found in 97 percent of the trees that had decay. Almost 80 percent of the decay in old-growth grand fir-white fir stands of eastern Oregon and Washington is caused by Indian paint fungus; in California, it is much less common 9. Insects from seven genera attack white fir cones and seeds. Two cause damage with considerable loss of seed. Seed maggots Earomyia spp. The fir cone looper Eupithecia spermaphaga covers almost the entire range of white fir and periodically causes considerable local damage Although many insects feed on white fir foliage, few cause significant damage as defoliators. The most destructive of these is the Douglas-fir tussock moth Orgyia pseudotsugata. Over most of its range the tussock moth shows equal preference for true fir and Douglas-fir foliage. Epidemic outbreaks, although sporadic, are explosive and damaging. In California, white fir is the preferred host, but outbreaks have not reached the severe levels sustained elsewhere Occasionally, localized outbreaks result in increased stand growth as mortality of subordinate trees "thin" an overdense stand 59, The western spruce budworm Choristoneura occidentalis is the most destructive defoliator in western North America, causing serious damage in Canada

and the Rocky Mountains and Pacific coast regions of the United States. Some outbreaks are short lived, but some continue for 20 years or more. Although initial damage is to new foliage and buds, trees can be completely defoliated in 4 to 5 years. Ultimate damage ranges from minor growth loss to major tree mortality over extensive areas, depending on severity and duration of the outbreak Damage to California white fir in the Warner Range has been sporadic and light The New Mexico fir looper Galenara consimilis is restricted to New Mexico and can be a serious problem locally on white fir. Weevils of the genus Agronus attack foliage of young trees and may cause concern with intensive forest management. In California, a species of Neodiprion sawfly has reached epidemic levels locally on white fir. White fir needleminer Epinotia meritana covers the full range of white fir and can cause extensive branch kill predisposing trees to bark beetle Scolytus attack

Chapter 2 : results in SearchWorks catalog

This Survey of natural regeneration of 5 conifer species ranging in age from 3 to 10 years on two major habitat types in the grand firzone of idaho, is a part of a larger study on the succession and management of the habitat types.

Viola sempervirens Trillium ovatum Coastal redcedar plant communities in British Columbia have been classified into 24 associations under 9 alliances in the Thuja-Rubus spectabilis order Life History Reproduction and Early Growth Flowering and Fruiting- When grown in the open, western redcedars begin to produce strobili at 10 years of age and usually every other year thereafter. Strobilus development can be artificially induced at younger ages and increased in mature trees by girdling or treating with gibberellin 8. The species is monoecious; male and female strobili are produced on different branches of the same tree, at different heights-the reddish male strobili on lower branches and the green female strobili nearer the treetops and farther from the trunk 38, Anthesis and pollination occur during March and April in southern stands near the coast. They occur during May and June in coastal Alaska and interior stands Seed Production and Dissemination- Each mature strobilus usually produces only 3 to 6 seeds 8 , but the strobili are often numerous and heavy seed crops are common. In dry years, conebearing stands in the interior tend to be on high, moist sites Major seedfall occurs during October and November in both ranges 2. Gibberellin-treated, containerized seed orchards should permit efficient management of seed production and harvesting 8. They fall faster and do not fly as far as the seeds of western hemlock, Sitka spruce, and Douglas-fir, but dissemination is adequate within m ft of a seed source 4, Seedling Development- Most seeds escape rodent and bird predation, but seedling mortality is high during the germination period Where moisture and temperature conditions are favorable, germination can occur in the autumn, winter, or spring. Almost no germination occurs after the first year, however. Seedbed quality may be critical. Throughout the range of western redcedar, disturbed mineral soil seedbeds seem to be a major requirement for regeneration from seed Although unburned soil benefits redcedar more than soil that has been scorched, slash burning favors redcedar by creating more mineral soil surfaces in cutover areas. Rotten wood that is in contact with the soil is the preferred seedbed in old redcedar groves Partial shade is beneficial because drought and high soil temperature damage seedlings in full sunlight, and poor root penetration causes damage from drought in full shade Direct seeding in the autumn is successful where soil moisture is available, but large quantities of seed may be required to obtain adequate stocking. In the nursery, spring sowing is best; half-shaded seedbeds are recommended Pelleting the seeds makes them more compatible with automated nursery sowing machinery 8. Containerized nursery seedlings can be produced in 7 months. They survive as well or better than bare-root stock when planted in coastal Oregon, Washington, and British Columbia, but 2-year-old bare-root stock tends to be most cost effective in the coastal range 6. Containerized stock planted in the spring appears to perform better than bare-root stock in the interior Natural regeneration is important in the northern Rocky Mountains, where it is most frequently successful on westerly and northerly aspects in western redcedar habitat types Western redcedar seedlings are less tolerant of high soil temperature and of frost than are the seedlings of Engelmann spruce, grand fir, and Douglas-fir. The exposed upper foliage of young redcedars often sunburns severely Roots of seedlings grow more slowly than the roots of Douglas-fir and incense-cedar, but they outgrow the roots of seedling western hemlock and Sitka spruce. Shoots have a longer growth period than any associated conifer. Non-rigid leaders are produced, and neither lateral nor terminal shoots form dormant buds. Lateral shoot growth is vigorous, amounting to at least 80 percent of terminal shoot growth in young redcedars Seedlings account for most of the western redcedar regeneration in clearcuts and other disturbed areas. On good coastal sites, they grow as tall or taller than Douglas-fir, western hemlock, and Sitka. The redcedars are subsequently overtaken by Douglas-fir by age 10 and western hemlock by age Vegetative Reproduction- Three types of natural vegetative reproduction occur: The resulting "veglings" are more abundant than seedlings in mature Idaho stands Saplings that have been knocked down in the western Cascades often regenerate when their branches

root. Redcedar clones are easily propagated by the rooting of stem cuttings. Although untreated cuttings will root, a 1-minute dip in a 3, ppm solution or a 4-hour soak in a to ppm solution of indolebutyric acid improves rooting speed, the number of cuttings rooted, and the total length of roots per cutting. Ramets for seed orchards can be produced by treating cuttings with indolebutyric acid, then rooting them in a 1-to-1 mixture of peat and perlite 8. Young fragmented stems can be induced to bud after being soaked in a cytokinin solution, and the resulting buds can be rooted on a culture medium that contains napthalineacetic acid and kinetin Sapling and Pole Stages to Maturity Growth and Yield- Intermediate redcedars are distinguishable from dominants by age 5 on good sites. Codominants usually can be differentiated from dominants by age Mean annual height growth of the dominants is 0. Annual radial increments of 10 mm or even 20 mm 0. Maintaining a nearly closed canopy at all times will benefit form because open-grown redcedars tend to develop excessively large limbs and multiple tops. Faster growing trees of acceptable quality can be grown at wide spacings if their lower holes are pruned 50 , but percentages of latewood decrease significantly The average age of maximum mean annual increment is 72 on poor sites and 58 on good sites in these British stands At ages 20 and 50, cumulative volume production is lower for western redcedar than for Douglas-fir and Sitka. Growth is often much slower. Suppressed redcedar trees that are years old but only 7. Survival for such long periods of suppression may be due to the ability of the species to produce new root growth in full shade. It may also be a result of frequent root grafting. Dominant trees often support growth of the root systems and lower boles of suppressed trees 9. Rooting Habit- Tree roots are extensive. Redcedars made up only 17 percent of the basal area but accounted for 82 percent of the root length in a mixed-species stand in northern Idaho Tap roots are poorly defined or nonexistent, but fine roots develop a profuse, dense network. Western redcedar roots usually are deeper than the roots of western hemlock but shallower than the roots of western larch, western white pine, grand fir, and Douglas-fir The soils on which these species usually grow may be responsible, however, because western redcedar, western hemlock, and Douglas-fir trees of similar size growing on similar soils have roots that penetrate to similar depths and extend over similar areas Shallow root systems are most frequent where soil bulk density is high. Redcedar roots cannot grow in dense soils penetrated by the roots of Douglas-fir, red alder, lodgepole pine, and Pacific silver fir Redcedar root systems also tend to be shallower and less extensive on wet sites than they are on deep, moderately dry soils. Where a thick duff layer is present, many redcedar roots lie in the duff rather than in the underlying soil. Root grafting is common 9. Western redcedar mycorrhizae are of the vesicular-arbuscular type, and redcedar seedlings are more responsive to mycorrhizal inoculation than are the seedlings of redwood Sequoia sempervirens , incense-cedar Libocedrus decurrens , and giant sequoia Sequoiadendron giganteum Reaction to Competition- Only Pacific silver fir, western hemlock, and Pacific yew are more tolerant of shade than western redcedar Its relative tolerance may be higher in warm than in cool areas, but redcedar is very tolerant wherever it grows, and it may be "the species of choice" for reforesting high, brush-risk areas near the coast 6. Often present in all stages of forest succession, redcedar occupies pioneer, seral, and climax positions Multiple attributes seem to be responsible-redcedar invades disturbed areas as widely distributed seeds but regenerates vegetatively in undisturbed areas, tolerating competition in both Nevertheless, it is usually considered a climax or near climax species. Western redcedar is best managed on moist sites characterized by the presence of ladyfern, queenscup, mountain woodfern, oakfern Gymnocarpium dryopteris , or thimbleberry. On poorly drained sites of lower quality, fertilizing with nitrogen appears to benefit growth Urea seems to be a better source of that nitrogen than ammonium nitrate Redcedar can be grown in stands of mixed species where uneven-aged management is practiced or when redcedar poles are to be produced under normal even-aged management regimes. But pure stands are more suitable for the long rotations needed to produce large sawtimber, shingles, and shakes. Where western redcedar is managed in mixed-species or uneven-aged stands, its excellent shade tolerance and long life should be considered. Redcedar is usually overtopped by Douglas-fir, grand fir, western hemlock, and western white pine. It tolerates understory conditions in mixed-species stands but often grows slowly there. In uneven-aged stands, western redcedar can maintain acceptable growth rates over long

periods, but it should not be given excessive crown space. Thinning from above may release the redcedars in mixed-species stands; thinning from below is preferable in uneven-aged stands of western redcedar. In the northern Rocky Mountains, growth response to release is best on large, young redcedars with green-yellow foliage growing on northerly aspects Redcedars probably should not be released when overtopped, however, because much of the increased growth after their release often occurs in large branches and a spreading crown rather than stem wood Most western redcedars are harvested by clearcutting the mixed-species stands in which they grow. Because of steep terrain, decay, and breakage, redcedar harvesting costs are high and lumber recovery is low Redcedars should not be left as scattered seed trees, however; even those along clearcut margins may be lost to windthrow or exposure. Effects of slash-burning vary with site conditions, but low-impact spring burns tend to benefit the mycorrhizal colonization of seedlings 6. Damaging Agents- Western redcedar is less susceptible than its associates to most damaging agents, but, as it is longer lived, damaged trees are common. Although they are as windfirm as Douglas-fir on dry sites, redcedars, are often windthrown in wet environments and are not resistant to windthrow on the moist sites where growth and yield are highest. Fire resistance also varies with environment. Redcedar is more severely damaged by fire than any of its associates along the coast but is less susceptible than Engelmann spruce, western hemlock, and subalpine fir in the interior Western redcedar suffers little damage from insects, but it is a host for several economically important insect species One of the most important is the gall midge, Mayetiola thujae, which sometimes seriously damages redcedar seeds in Oregon, Washington, and British Columbia. Newly planted seedlings are occasionally damaged by a weevil Steremnius carinatus in British Columbia, and larger trees are killed by a bark beetle Phloeosinus sequoiae on poor sites in southeastern Alaska. The western cedar borer Trachykele blondeli causes degrade and cull in sawtimber. More than fungi are found on western redcedar, but it is less susceptible to pathological attacks than are most of its associates. Indeed, redcedar may be a suitable alternative species on coastal Douglas-fir and western hemlock sites where soils are infected with Phellinus weiri, Fomes annosus, or Armillaria spp. Nevertheless, many attacks occur during the long lives of some redcedar trees, and the heartwood extractives that provide decay resistance are eventually detoxified through biodegradation by a series of invading fungi As a result, the volume of accumulated decay in living trees is greater for western redcedar than for any other major conifer in British Columbia 25 , and hollow old trees are common in the interior 7.

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Chapter 3 : Thuja plicata Donn ex D

Title / Author Type Language Date / Edition Publication; 1. Natural regeneration in two central Idaho grand fir habitat types: 1.

Click the image to enlarge. Upper North Fork Roadless Area is 63, acres of strikingly varied and majestic landscape unfolding on the Idaho-Montana border. This description includes the adjacent Rawhide Roadless Area since, for all practical purposes the areas are contiguous. The long-defunct Rawhide Roadâ€”now just a dirt trailâ€”is all that separates them. Located approximately 40 air miles west of Missoula, Montana, this country ranges from narrow, flat valley bottoms to steep breaklands framing drainages; from sloping meadows and shady woods to jagged ridges and carved cirque basins. Sharp, rugged relief above 7, feet occurs along the Bitterroot Divide, separating Idaho from Montana, with a few glacial lakes punctuating the ridges. Topography softens in the North Fork of the Clearwater drainage, dropping to just under 4, feet, where the watercourse leaves the area. Among the varied terrain three major vegetative ecosystems are found. Ascending slopes up to 6, feet spreads western spruce-fir cover. Alpine meadows, carex, and beargrass carpet the high ridge elevations. In the early s these regions met the same fate as many in the Clearwater Basin: Other species present include subalpine fir, western larch, mountain hemlock, grand fir, and white bark pine. The region is crucial habitat for elk, lynx, moose, black bear, whitetail and mule deer, possiblyâ€”though unconfirmedâ€”grizzly, and plethora birds and animals indigenous to conifer-covered mountains in north-central Idaho. The unmatched cold, clear waters of Meadow Creek is the most important spawning and rearing locale for bull trout in the state. Cutthroat and rainbow trout find it and the other creeks and lakes apt habitat as well. The large size, varied topography, and dense vegetation screen provide remarkable opportunities for solitude and for experiencing the incomparable countryside, be it through hiking, camping, horseback riding, hunting, fishing, or photography. Stateline Trail , which extends north from Hoodoo Pass along the Bitterroot Divide, is a designated National Recreation Trail, and has long been used by indigenous peoples, then trappers, and now outdoor enthusiasts. Historic evidence indicates early Native Americans used selected sites along the Divide for killing game that crossed or were driven from one side to the other. Approximately acres of the St. Finally, considerable early day mining and Forest Service activity has left scattered traces on the areas boundary. The pressing need to protect this area cannot be overstated. Wilderness designation would safeguard the pivotal integrity and purity of the headwaters of two substantial river systems.

Chapter 4 : Catalog Record: The grand fir/mountain maple habitat type in | Hathi Trust Digital Library

series of habitat types for common harvest and site probability of obtaining natural Douglas-fir regeneration. pend on habitat type. In central Idaho, Steele.

Foliage on a tree in habitat [C. Branch with foliage on a tree in habitat [C. Fully ripe cone starting to dehisce at a stand in eastern Washington [C. Fire suppression is allowing young Abies grandis to invade this old Larix occidentalis stand in eastern Washington [C. Don Lindley Common names Grand, lowland, white, silver, yellow or stinking fir Peattie , sapin grandissime [French] Hunt Vidakovic , Pinus grandis Douglas ex D. Don Hunt This species displays some interesting morphological variation. Some authorities discriminate populations east and west of the Cascade crest as Abies grandis var. The distinction between the two varieties, although not generally remarked in the American literature, has been known for a long time in Britain from provenance trials Lines , which showed that trees from coastal origins grow about twice as fast as those from interior origins, the latter being similar to A. There are also some foliage and cone differences; var. Curiously, the varieties do not show any significant differences in leaf essential oil composition, a finding borne out by three independent studies Adams et al. Both of these varieties can also be treated as subspecies; I prefer to use varietal rank as the differences are ecotypical, of the sort that can arise within a few generations and may be post-glacial in origin. However the distinction between subspecies and variety is admittedly a subtle one. Near its southern range limits, A. Hunt is of the opinion that specimens in lower, wetter habitats are best assigned to A. My field observations, though, suggest that the higher habitats are the wetter cooler, more snowy ones, and the trees there resemble A. I have observed this same phenomenon in Rocky Mountain populations of A. Description Trees to 75 m tall and cm dbh; "crown conic, in age round topped or straggly. Bark gray, thin to thick, with age becoming brown, often with reddish periderm visible in furrows bounded by hard flat ridges. Branches spreading, drooping; twigs mostly opposite, light brown, pubescent. Buds exposed, purple, green, or brown, globose, small to moderately large, resinous, apex round; basal scales short, broad, equilaterally triangular, slightly pubescent or glabrous, resinous, margins entire, apex pointed or slightly rounded. Distribution and Ecology Canada: Hardy to Zone 6 cold hardiness limit between See also Thompson et al. Distribution of Abies grandis orange , A. Data from USGS Big tree Largest volume: Height 77 m, dbh cm, stem volume Oldest Aho cites a ring count of , of which rings are in the first 7. This indicates that the tree attained an impressive age because it spent a long time as a small suppressed advance regeneration tree in the forest understory. A similar situation has been observed among the oldest individuals of Abies amabilis and Abies lasiocarpa , as well as in various species of Picea and Tsuga. Dendrochronology Ethnobotany Observations In western Washington and western Oregon, the coastal form of the species is relatively uncommon. Some fine examples can be found along the south shore of Lake Crescent in Olympic National Park; the largest specimen of the species was formerly found here felled by a severe storm. As noted above Big trees , some exceptional trees can also be found along the Duckabush River in the eastern Olympics, along the Chilliwack River in British Columbia, and in the Glacier Peak Wilderness. It typically occurs at fairly low elevations, in the company of Pinus ponderosa and Pseudotsuga menziesii var. As the name suggests, it is also a great place to see big Pinus monticola. Look for it at elevations above m while still south of the California-Oregon border. See the Topics page for more on Douglas. Citations Adams, Robert P. The leaf essential oil of Abies grandis Doug. Decay of grand fir. Natural variation within and between the silver firs. Scottish Forestry 33 2: See also Farjon, Aljos.

Chapter 5 : U of I Experimental Forest

during a second study in central Idaho Douglas-fir (Pseudotsuga menziesii), grand fir, and subalpine fir (Abies lasiocarpa) habitat types, and from Douglas-fir and subalpine fir habi- tat types in northern Idaho during to

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Chapter 6 : Abies concolor (Gord

Both artificial and natural regeneration should prove successful on properly prepared sites. Young Pinus ponderosa grow rapidly but sampling only the near-climax conditions precluded a meaningful site index for this species.

Chapter 7 : Natural Regeneration in Two Central Idaho Grand Fir Habitat Types. -

Natural regeneration in two central Idaho grand fir habitat types / fir habitat types at Silver Creek, central Idaho / mountain maple habitat type in central.

Chapter 8 : Kathleen Geier-Hayes | Open Library

Books by Kathleen Geier-Hayes, Determining individual tree shade length, Vegetation response to helicopter logging and broadcast burning in Douglas-fir habitat types at Silver Creek, central Idaho, Natural regeneration in two central Idaho grand fir habitat types, Occurrence of conifer seedlings and their microenvironments on disturbed sites in central Idaho.

Chapter 9 : Browse subject: Balsam fir | The Online Books Page

The Douglas-fir/ninebark habitat type in central Idaho: succession and management. Boise, ID: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station; 83 p.