Clear All Entries

Caring For Your Forest
A Self-Study Guide to

Owner/owners last name/names

Property

, Alaska

Nearest community

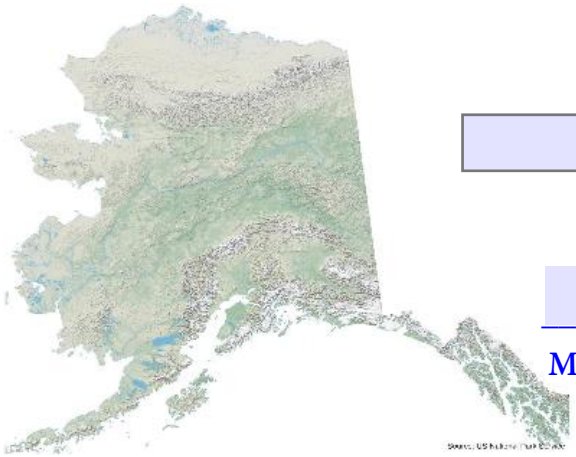
Total Property Acres:

Total Forested Acres:

Written by

_____,_____

Month , Year plan was written



Alaska Division of Forestry Stewardship Program

For help on using this guide,
contact Trevor Dobell-Carlsson at 907-269-8667,
or email:
trevor.dobell@alaska.gov

Division of Forestry
Stewardship Web Page

What can you gain from this document?

- This document is intended to help you learn more about forests, and apply this knowledge to better care for your forested land.
- Learn more about your forest at your own pace.
- Learn how to identify tree species and and how to deal with a variety of issues affecting forests in Alaska.
- Establish goals for your forest, by learning goals commonly pursued by forest landowners.
- Learn basic forest practices necessary to reach the goals you have in mind for your forest.
- Gain information about topics related to forestry such as soil science, fertilizing, wildlife habitat, invasive plant species, and pollinators.
- Use this document to provide information to forestry and firefighting professionals.
- Minimize the impacts of forest pests and diseases.
- Create and sustain Defensible Space from wildfires.
- Access web-based programs so that you can learn more about the environmental factors that influence forests.

Limitations of this plan document:

Working through this self-study guide will give you more insight on forests, but there are limits to what you can learn on your own, even after reading and drafting a management plan for your forest. You will not be able to carry out the following without assistance or review from a forestry professional:

- Estimating volume for a commercial timber sale on your property using the volume estimation equation in this document. It works for estimating firewood quantities, but does not imply or express accurate commercial volumes, sort or grade. Such information would require an assessment by a qualified professional.
- Planning a large-scale reforestation project. Planting several acres with hundreds of seedlings requires more details about the planting and logistics.
- Obtaining a grant from the Natural Resources Conservation Service without review by a representative of the Natural Resources Conservation Service or the Alaska Division of Forestry.

Creating a Forest Management Plan

You can complete this document, study the associated information and create a forest management plan for your property. Or you can send your draft to the Division of Forestry for their review and advice on taking care of your forest. Any photographs of your trees that you share are valuable to a forestry professional, and will help illustrate your forest and its conditions so that they can provide technical advice.

- ☐ I request that the Division of Forestry review my draft forest plan and provide suggestions.
- ☐ I request a site visit from the Division of Forestry to look over my property and recommend forest management options.
- ☐ I would like to create a Forest Stewardship Plan for my property based on the information that I am providing about the forest conditions and my goals for my forest.

My property address is:

If you want your plan to be reviewed by the Division for Forestry, you can either email an electronic copy or mail a hard copy.

Email an electronic copy to:

trevor.dobell@alaska.gov

Or

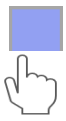
Send a hard copy to:

Alaska Division of Forestry
Stewardship Program: Attn: Trevor Dobell-Carlsson
101 Airport Rd
Palmer, AK 99645

Working with this Guide

There are many check boxes in this self-study guide. Some of the check boxes allow you to check multiple items; others are either/or choices. There are also blank sections for you to enter your thoughts on various topics. This approach is intended to guide you through the process of learning about forests and planning activities necessary to meet the goals you have for taking care one of your most important investments: Your Forest.

There are numerous check boxes in this study guide. This approach is designed to guide landowners through learning more about forests by asking key questions.



- The square check boxes can be checked independently of the other check boxes.

- ○ - The round check buttons are either/or responses.

There are also boxes to type in your thoughts and observations:

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This guide was written by John Winters as an effort to reach as many forest landowners as possible with information on how to care for their forested land, large and small.

With special thanks for their help and support:

Trevor Dobell-Carlsson - Division of Forestry
Ashley List - Division of Forestry
Sue Rodman - Department of Fish & Game,

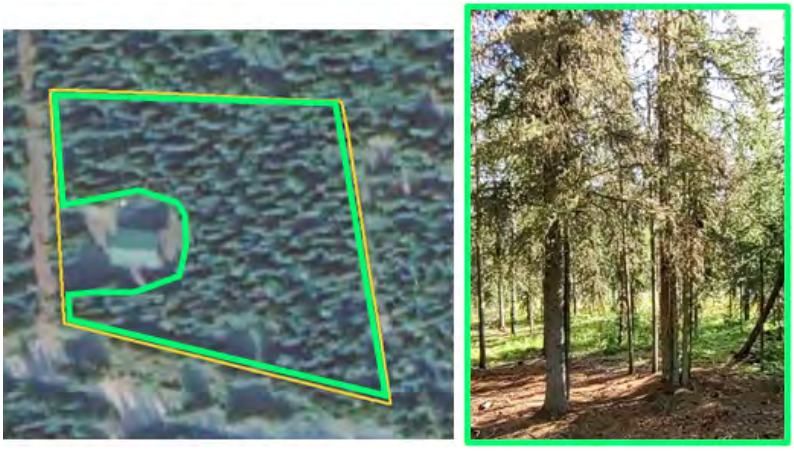
and to the landowners who have used this guide and provided their feedback.

Enjoy your Alaskan Forest!

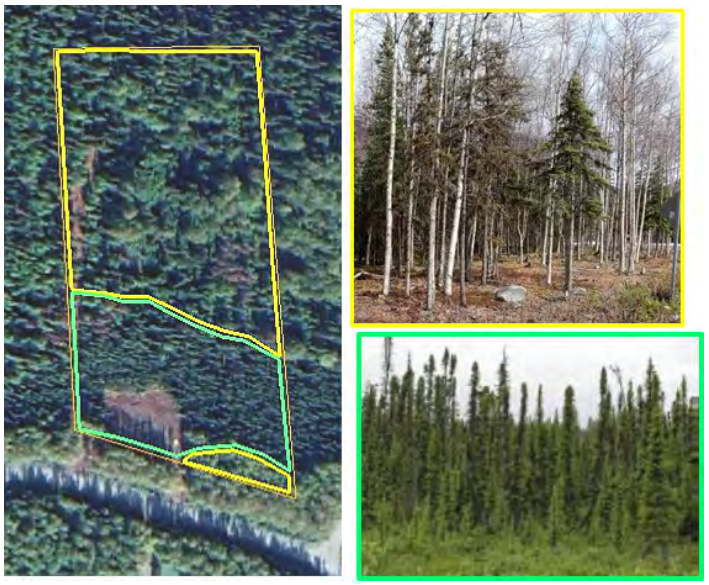
Forest Description Section

Forest Stands

A forest stand is a community of trees and associated vegetation in which species composition, age, or condition can be distinguished from the surrounding area. They are a subset of forests. A forest stand could simply be the forest within your property lines. A property could have more than one forest stand on it, although the smaller the parcel, the more likely the property will have one stand. Also, it is possible to have more than one stand on your property needing the same management actions such as dead tree removal or thinning.



Single Forest Stand of Spruce on a two-acre property.



Hardwood stands (outlined in yellow), and one stand of black spruce (outlined in green), on a three-acre property.

Species Diversity

Forest stands are made up of particular species. There could be a single species, a mix of two or more species. "Pure" and "mixed" are terms often used to describe a stand of trees. Stands of trees that appear to have a single species, and are therefore "pure", could actually contain a few trees of different species.

Age Diversity

Forest stands with trees of varying ages are said to have age diversity. Looking at your own property, do you see larger dominant trees as well as young seedlings beneath them? Do the trees appear to be the same size, perhaps a plantation? As is true for species diversity, a variety of ages among trees helps ensure that the forest can sustain itself.

Species and Age Diversity Advantages

A variety of species and/or ages offers a chance for a forest to prevail through fires, windstorms, infestations and other events that can wipe out particular tree species or ages. Bark beetles attack and kill mature white spruce trees but seldom young saplings and never aspen, cottonwoods or birch trees. Fires burn both young and old spruce trees; less flammable hardwood species often survive fire.

Forest Description Section

Single Stand

☐ There is a single stand of trees on the property, with either one species or a mix of species.

☐ There is more than one stand of trees. The stands differ in species mix (composition), size, ages, etc.

Multiple Stands

☐ **Single Species**
The forest stand contains a single dominant species with few if any other species.

The most abundant tree species in the stand is:

☐ White Spruce ☐ Black Spruce ☐ Sitka Spruce ☐ Eastern Larch(Tamarack)

☐ Mountain Hemlock ☐ Western Hemlock ☐ Paper/Alaska Birch

☐ Black Cottonwood ☐ Aspen ☐ Balsam Poplar

Single Species

☐ **Mixed Species Stands:**
There are at least two tree species in the stand mixed together.
The species present are:

☐ White Spruce ☐ Black Spruce ☐ Sitka Spruce ☐ Eastern Larch (Tamarack)

☐ Mountain Hemlock ☐ Western Hemlock ☐ Paper/Alaska Birch

☐ Black Cottonwood ☐ Aspen ☐ Balsam Poplar

Multiple Species

Need help identifying your tree species? Click the button next to the species to read more about the species in Common Trees of Alaska, located in the Appendix.

- ⓘ White Spruce
- ⓘ Black Spruce
- ⓘ Sitka Spruce
- ⓘ Western Hemlock
- ⓘ Mountain Hemlock
- ⓘ Eastern Larch (Tamarack)
- ⓘ Western Redcedar
- ⓘ Yellow Cedar
- ⓘ Shore Pine (Lodgepole pine, (Southeast Alaska)
- ⓘ Paper Birch
- ⓘ Aspen
- ⓘ Black Cottonwood
- ⓘ Balsam Poplar

Forest Description Section

Species composition is the mix of species in a forest stand. The table below will help you estimate the proportion of species in your forest. Estimate the percentages the best you can.

☐ The tree species percentages I checked are for my entire property.

☐ The tree species percentages I checked are for one stand on my property. A sheet for recording additional forest stands on the property are at the back of this document.

What is the species mix on your property? Use this table to give it your best guess:

What is the species mix on your property?

Select the range of percentages that best fits the tree species in your forest. Make sure to check only one box for each tree species on your property.

Species	Percent of Tree Species				
	100 to 75%	74 to 50%	49 to 25%	Less than 25%	Less than 10%
White Spruce	☐	☐	☐	☐	☐
Black Spruce	☐	☐	☐	☐	☐
Sitka Spruce	☐	☐	☐	☐	☐
Lutz Spruce	☐	☐	☐	☐	☐
Mountain Hemlock	☐	☐	☐	☐	☐
Western Hemlock	☐	☐	☐	☐	☐
Eastern Larch (tamarack)	☐	☐	☐	☐	☐
Birch	☐	☐	☐	☐	☐
Balsam Poplar	☐	☐	☐	☐	☐
Cottonwood	☐	☐	☐	☐	☐
Aspen	☐	☐	☐	☐	☐

Other observations about the tree species on your property such as nonnative species, fruit trees, etc.

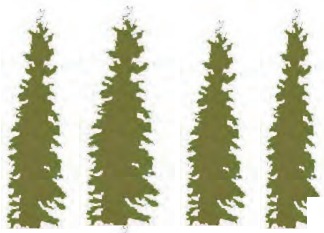
Age Diversity of Trees: Even Aged vs Uneven Aged

As is true of species diversity, a wide diversity of ages within tree species provides greater chances that a forest can sustain itself over time. Fires, windstorms, diseases and infestations affect forest trees in varying ways depending on the ages of trees.

For example, spruce beetles are able to infest and kill older spruce trees yet almost never attack young seedlings. A small fire burning grass and moss may not damage mature trees, but will kill young seedlings.

With a wide tree age diversity, it may be possible to harvest large trees and still have young trees to emerge as eventual replacements without the need for planting new trees.

Limited Age Diversity - Even aged Stand



The trees on the property appear to be similar sizes, and appear to have originated from roughly the same time. There are few small seedlings or large dominant trees. The trees may have originated from a single event such as a fire, or an old land clearing.

Wide Age Diversity - Uneven aged Stand

There is a variety of tree sizes, from small seedlings, pole-sized trees, to large dominant trees.

Tree Heights

Height is a fundamental tree measurement, commonly used to calculate the volume of wood--without cutting the tree down. Height also reflects the age and vigor of trees. It also indicates the quality of the site the trees are growing on and provides a means to monitor forest growth over a period of time. Height measurements are done with instruments that use precision optics and/or laser technology. Several smart phone apps are available to estimate heights. Two simpler methods involve using a stick held vertically at arm's length, sighting to the tree.

How tall are the trees in your forest?

Select from the drop-down box: ----

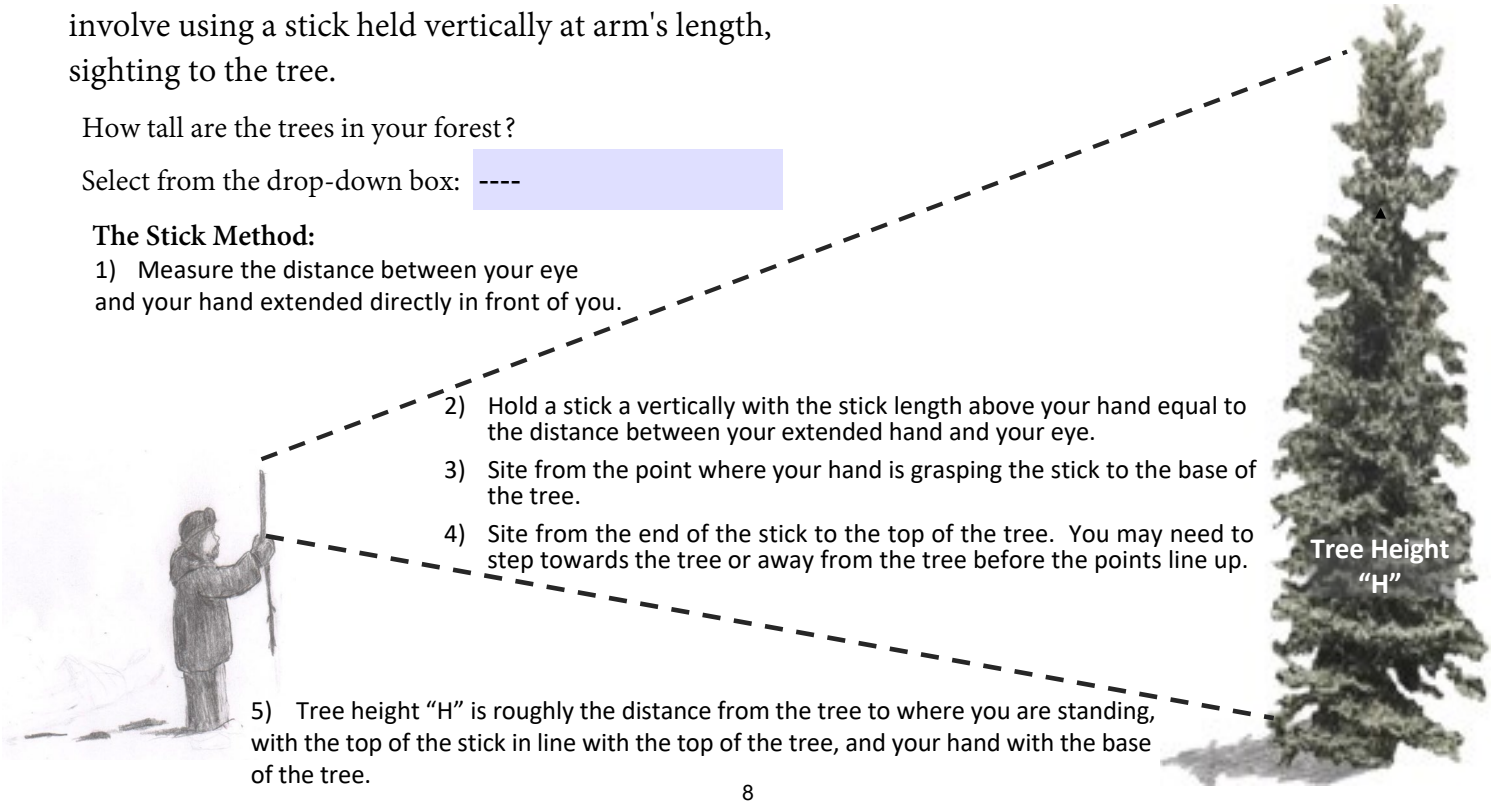
The Stick Method:

1) Measure the distance between your eye and your hand extended directly in front of you.

2) Hold a stick a vertically with the stick length above your hand equal to the distance between your extended hand and your eye.

3) Site from the point where your hand is grasping the stick to the base of the tree.

4) Site from the end of the stick to the top of the tree. You may need to step towards the tree or away from the tree before the points line up.



5) Tree height "H" is roughly the distance from the tree to where you are standing, with the top of the stick in line with the top of the tree, and your hand with the base of the tree.

Forest Conditions Section

☐ **High Tree Density**
There are many stems tightly spaced (a few feet apart). Stems are narrow and trees appear "top heavy" with most branches concentrated in the top 10 to 20 percent of the trees. There are small dead trees overshadowed, stunted, or with little foliage. Overstocked stands are a concern because they are less productive, vulnerable to infestations and diseases. Young trees are overshadowed. With diminished sunlight, and intense competition for space, regeneration is inhibited. Forest productivity becomes stagnant. Dense spruce burn with great intensity, and fires are more difficult to suppress.

☐ **Insects or Diseases**
Trees have discolored or dead foliage. Trees are dying at increasing rates. There is rot noticed in firewood. Woodpeckers have been heavily foraging spruce trees. There are conks--fungal growths on the main trunks.

☐ **Non-Biological Damage to Trees**
Trees are dead or dying, have fallen over, have torn bark or primary branch breakage not associated with insects or disease. Wind, frost, ice damage and animal browsing are possible causes.

☐ **Spruce Trees or dead trees near Structures**
There are spruce trees within 30 feet of the house. Trees are growing underneath or near power lines. There are dense concentrations of spruce trees within 100 feet of the house. Tree-to-tree spread ("crown fires") appear likely. Lower branches of spruce trees are near the ground; and could be ignited by fire burning along the ground ("torching").

☐ **Lack of Species and Age Diversity**
There is one or very few other species on the property, even though there are other species naturally occurring in the surrounding area.

Other issues with my forest observed:

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Forestry Goals

This table shows common goals that forest landowners have. Feel free to add a forestry goal not shown in the table.

Goal	Reference Information
Maintain tree species and age diversity, to create a resilient forest. A resilient forest can prevail through fires, infestations and other disturbances..	This is a recommended goal for any forested property and should be carried out as an ongoing process.
Fire Protection: Defensible Space.	Fire Protection Section
Insect and Disease Awareness and Mitigation.	Insect and Disease Section
Reforestation: Growing new trees.	Reforestation Section
Wood Utilization.	Wood Utilization Section
Creating / Maintaining Privacy Screening	Privacy Screening Section
Creating and Protecting Wildlife Habitat.	Wildlife Habitat Section

Other Forest Management Goals for the Property:

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Fire Protection Section
Defensible Space Around Structures

Firewise USA

☐ Fire Protection is a goal for the property.

☐ There is adequate defensible space around the house.

☐ Defensible space could be improved by removing dead trees from around the house, thinning out dense groups of spruce trees and removing the lower branches of spruce trees (pruning).

☐ I am interested in other tasks that will help sustain defensible space such as retaining or planting hardwood trees, alder, willow, lawn grass, moss and other herbaceous plants less prone to ignition.

Some of the tree conditions illustrated in the diagram below apply to my property:

☐ Hardwood trees are within 100 feet of the house.

☐ Dead trees within 100 feet of the house.

☐ Spruce trees within 100 feet of the house.

☐ Spruce trees within 30 feet of the house.

☐ Spruce branches extend to the ground.

☐ Spruce trees are close together, less than 12 feet apart.

☐ Ground cover is mostly tall grass.

☐ Ground cover is mostly moss or herbaceous plants.

☐ There are accumulations of building scraps, trash.

Other comments about the existing fire risk:

Recommended Actions and Expected Results

The recommended actions in the table below are expected to result in improved fire protection and contribute to other forest management goals. The tree condition items on the previous page that you checked are displayed left of the table below.

Fire Risk	Recommended Actions	Expected Results and Contributions to other Forest Management Goals
Spruce trees are within 30 feet of the house and structures.	Remove in the fall and winter months to avoid beetle outbreaks.	Reduces fire intensity near the house, making it easier to defend from wildfire. Fall/winter activities reduces spread of bark beetles benefiting Insect & Disease Control.
Spruce trees are within 100 feet of house and structures.	Remove if trees are diseased, infested or have defects or physical damage. Retain quality spruce trees, that appear vigorous.	Reduces the potential intensity of a fire near structures, making them easier to defend. Retaining high quality spruce trees enables spruce regeneration and Age Diversity.
Spruce trees are close together, branches are touching or intertwined.	Thin dense trees so that there is space between adjacent tree crowns. Consult with a forester for recommended spacing between trees.	Fire spread from tree to tree is inhibited by increased spacing between trees. Remaining trees have more sunlight and access to water and nutrients in the soil. Forest Health is improved.
Spruce branches extend to the ground. Fires can ignite lower branches and spread up the tree.	Prune the lower limbs of spruce trees from September through January. For large spruce trees, remove the lowest 8 feet of limbs. For smaller spruce remove the bottom 40% of branches.	Pruning creates a gap between ground fire and flammable spruce limbs. Fires in surface vegetation is far less intense than burning spruce trees. Pruning spruce trees during fall and winter months minimizes stress on trees and will not attract bark beetles.
Dead trees are within 100 feet of house.	Removal when convenient if tree has been dead for over a year. Dead trees do not attract bark beetles.	Forest Products yield through timber harvest—even if the product is firewood. More sunlight and space available to surrounding trees. Forest Health is improved.
Ground cover is tall wild grass. Fire moves fast and surprisingly intensely through grass.	Within 30 feet of houses, mow to less than 4 inches. Lay gravel fringe around foundation to deter grass. Scarify grass away to planting less flammable vegetation.	Flashy fuels near house are reduced. Grass removal can promote growing less flammable shrubs or ground cover. Promotes reforestation.
Hazardous materials such as paints, fuel, plastics, rubber are exposed to ignition.	Remove or safely store materials that could emit toxic fumes if ignited.	Exposures to toxic fumes during a wildfire are reduced, making it safer for firefighters and anyone else in the area.
Hardwood trees within 100 feet of the house. Ground cover is moss or herbaceous vegetation.	These are not usually fire hazards since hardwood trees, moss and herbaceous vegetation do not burn as intensely as dead vegetation, spruce trees or tall grass.	Both items are helpful for reducing potential fire intensity, and reducing the chance of structures igniting.

Fire Protection Section

Property

Use this page to sketch an overhead diagram of your property, clearances from the house and outbuildings. Aerial images of your property may be available on Google Earth or from a local government GIS website.

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Firewise Risk Rating Questionnaire

Developed by the Alaska Wildfire Coordinating Group, this survey will determine your home's general fire risk. Your home and all materials connected to your home may be fuel for fire. To protect your home from ignition, all flammable materials around your home must be considered. In a wildfire, your defensible space preparation will help you protect your home from ignition.

Risk Ratings are a numerical scale to help reflect the relative risk of your house being burned by a wildfire. The higher the number that you check for each rating factor, the higher the risk factor. Nothing can be done to change the prevailing terrain. Little if anything can be done to improve roads or infrastructure. Therefore, this survey can help determine risk factors on your land that you can mitigate such as vegetation near the house, construction materials, or flammable items storage as shown in Section I and II.

Risk Factors	Description	Maximum Rating for this factor	**Risk Rating for your property**
Section I: Natural Conditions	-Flammability of vegetation -Tree species and conditions -Ground vegetation -Topography -Prevailing winds, local climate -Fire history in the area	24	**0**
Section II: House Design & Construction, Storage and Yard Upkeep Practices	-Roof and siding material -Enclosures or screening for decks, soffits, chimneys -Storage of flammable or hazardous materials (items that would produce toxic fumes if ignited)	25	**0**
Section III: Road Access	-Bridges with limited capacities -Pavement, grade, overall accessibility for large vehicles.	16	**0**
Section IV: Community Infrastructure	-Powerlines and Right-of-way maintenance -Emergency response capability -Water supply -House Identification	23	**0**
Remote Property	-No Road. Property is remote. Emergency response is limited to aircraft, boats or all-terrain vehicles. Fewer fire resources available to respond to a fire. Road Access and most of the Community Infrastructure Factors are irrelevant if the property is remote access.	16	**0**

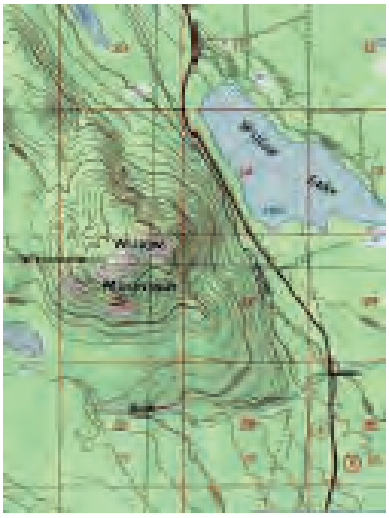
Overall Risk Rating: **0**

Low: 1-22 Medium: 23-44 High: 45-66 Extreme: 67 - 90

Section I: Natural Conditions

Sum of Risk Factors - Natural Conditions: 0

Topography:			
Slopes on or near the property			
Minimal slope present (less than %10)	○	1	0
Moderate slopes (10-30%)	○	3	
Steep slopes (greater than 30%)	○	5	



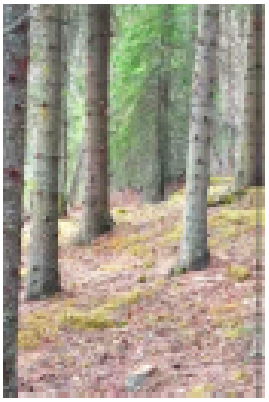
Other Topographic Features			
Draws/ravines or a canyon	☐	2	0
Ridge top	☐	2	0
Slope Aspect: Does the slope face southeast, south, or southwest? southwest?	☐	2	0

Weather and Fire History			
Strong winds occur in the area	☐	4	0
Recent fire history. Has there been more than one wildfire in the area (~5 miles) within the last 10 years?	☐	2	0

Fuels (Vegetation)			
Light fuels (short grass or cultivated green fields)	○	0	0
Medium fuels (tall grass, brush, small trees, tundra)	○	1	
Mixed Spruce / hardwood (60% hardwood)	○	2	
Heavy Conifers (conifer limbs reach the ground)	○	3	
Dead (piled unburned fuels, dead spruce trees)	○	4	

Defensible Space and Fuels Treatment			
Spruce trees within 100 feet of structures are healthy, *pruned of lower limbs and spaced apart.	○	0	0
Spruce trees, dead trees are 30 to 60 feet from structures. Spruce trees are not pruned or thinned.	○	1	
Spruce trees, dead trees and vegetation within 30 feet of house.	○	3	

Lower limbs not pruned



*Lower limbs pruned

Clear entries to start over or make corrections in the **Natural Conditions Section**.

Section II: House Design, Construction, Storage and Yard Upkeep Practices

Sum of Risk Factors - House Construction: 0

Roofing Material			
Metal or tile roof	○	0	0
Asphalt composition roof	○	1	
Composition roof covered w/ needles, leaves and/or moss or, treated shake roof.	○	2	
Home has wood shake shingle roof, untreated	○	3	
Unrated type roof (unfinished, tar paper, blue tarps etc.)	○	4	
Deck Material			
No deck or non-combustible	○	0	0
Combustible deck	○	1	
Siding			
Non-combustible siding	○	0	0
Combustible siding	○	1	

Eaves, balconies and crawlspaces			
Home has enclosed (or screened) eaves, decks, crawl spaces	○	0	0
Home has enclosed, or screened eaves. Balcony, deck and crawl space is not enclosed or screened.	○	1	
Eaves, balcony, deck and crawl space is not enclosed or screened	○	3	
Chimney			
Chimney is screened	○	0	0
Chimney is NOT screened	○	3	

Gas/Fuels Utilities (propane, diesel, etc.			
Fuel tanks stored underground, or there is no fuel tank.	○	0	
Fuel tanks stored above ground			
Fuel tank is stored over 30 feet away from home / structure	○	1	0
Fuel tank within 30 feet of home / structure	○	3	
Fuel for any purpose is stored within 30 feet of the house and unprotected from fire.	☐	3	0

Clear entries to start over or make corrections in the **House Design, Construction, Storage and Yard Upkeep Practices Section**

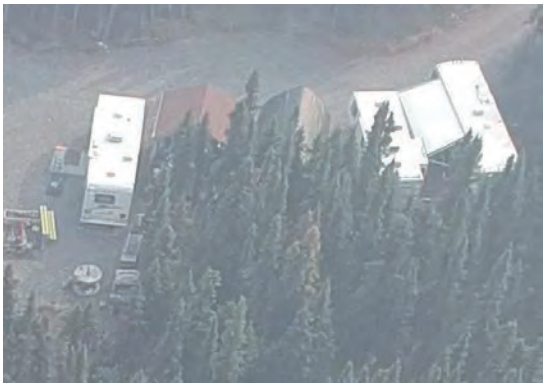
Section II: House Design, Construction, Storage and Yard Upkeep Practices, continued:

Firewood Storage			
No firewood piles/woodsheds > 30 feet from structure	◯	0	0
Firewood piles/woodsheds within 30 feet of structure	◯	1	
Firewood pile within 15 feet of home	◯	2	
Firewood stored under eaves or under deck	◯	3	

Machine Storage (lawnmower, snow machines, boats, etc.)			
Gas powered machines stored more than 30 feet from house	◯	0	0
Gas powered machines stored less than 30 feet from house	◯	1	

Nearest Adjacent Structures (Building Density)			
Greater than 100 feet between structures	◯	0	0
30-60 feet between structures	◯	2	
Less than 30 feet between structures	◯	3	

Burning trash and yard debris			
Does not burn yard debris in summer.	◯	0	0
Burns infrequently, and follows permit terms.	◯	2	
Burns yard debris often	◯	3	



Burn Barrel			
Never burns on the property	◯	0	0
Burn barrel meets State specifications and is more than 30 feet away from home.	◯	2	
Burn does not meet State specifications; is less than 30 feet away from home.	◯	3	

Section III: Road Access

Sum of Risk Factors - Road Access to the Property: **0**

No Road. Property is accessed by aircraft, ATV, boat or snowmachine. Make sure to check the "Remote Property" box on Page 14 at the beginnng of this survey, and do not check any items in this section, as it will over estimate your Risk Rating.

Road Access			
All-season Road			
Multiple Roads In/Out	○	0	0
Single Road In/Out	○	1	
Seasonally Maintained Road			0
Multiple Roads In/Out	○	2	
Single Road In/Out	○	3	
Paved	○	0	0
Unpaved	○	1	

Road Slope			
Flat (less than 5%)	○	0	0
Moderate (5-12%)	○	1	
Steep (greater than 12%)	○	2	

Clear entries to start over or make corrections in the **Road Access Section**.

Firewise Risk Rating Questionnaire

Section III: Road Access, continued

Bridges			
No Bridge	○	0	0
Two lane (heavy weight limit)	○	1	
One lane bridge (moderate weight limit)	○	2	
Limited access by small bridge limited weight capacity for vehicles	○	3	

Driveway to Road			
Full access for Fire Vehicles from Road**	○	0	0
Limited access for Fire Vehicles (over 200 feet)	○	1	
Only 4WD vehicle access	○	2	
Only accessible by ATV	○	3	
Limited to footpath only from road	○	4	

Parking, Turn-arounds			
Road Loops or more than 40 feet by 40 feet of parking	○	0	0
Dead End with turn-around or cul-de-sac	○	1	
Dead End with no turn around	○	2	

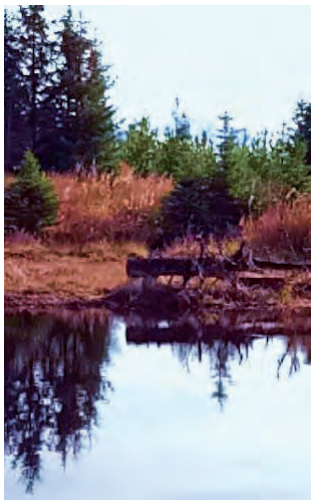
Firewise Risk Rating Questionnaire

Sum of Risk factors Infrastructure **0**

Section IV: Community Infrastructure

Electrical Utilities			
No electrical utilities--roadless location, generator used.	○	0	0
Underground within 200 feet of residence	○	0	
Above ground lines within 200 feet of residence	○	1	
10 foot easement of power lines maintained.	○	1	0
10 foot easement of power lines NOT maintained	○	3	

Water Supply			
Hydrants			
Hydrants within 1,000 feet	○	0	0
Hydrants greater than 1,000 feet	○	1	
No hydrants available	○	3	
Draft Sources			
Draft Source Available- open water	○	2	0
No draft sources	○	4	



House Identification			
House has address number displayed	○	0	0
House address not displayed	○	3	

Response Resources			
Fire Department less than 5 miles	○	0	0
Fire Department more than 5 miles from home	○	1	
No organized response (Out of fire service area)	○	3	

Clear entries to start over or make corrections in the **Community Infrastructure Section.**

Fire Protection To-Do List
Post address number on house and at street. 3 inch tall, reflective.
Clear driveway 12 feet wide, 13.5 feet tall
Remove leaf litter from around structures.
Clean debris off roof and gutters; remove overhanging branches.
Enclose decks and porches.
Screen dryer/exhaust vents.
Enclose roof eaves.
Remove dead trees and live black spruce trees.
Bring burn barrel up to code: screen, vents, and firebreaks.
Have enough hose on hand to reach every part of your yard.
Sit down with your family and create an evacuation plan.
Store flammables in a safe location: away from house or in a shed.
Remove stored items from against or under house to safe location
Keep lawns, flower beds, gardens watered and trimmed.
Install 12 inch metal flashing around structure(s).
Create 30 feet minimum of defensible space around structure(s).
Establish alternate water supply.
Clean vegetation from around propane/oil tank.
Move wood pile 30 feet away from structure(s).
Contact your utility company to have utility line easements cleared.
Thin trees in densely forested areas.
Trim away all ladder fuels up to 8 feet. (Trim spruce in winter)
Remove flammable yard debris: grass, leaves, branches, etc.

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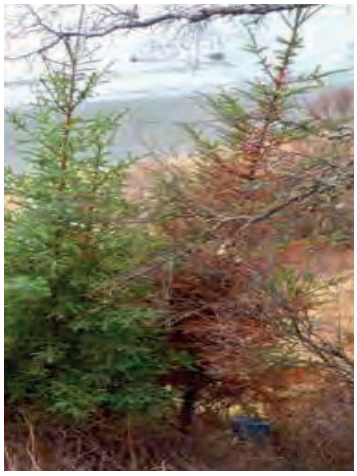
Insect & Disease Section

Insect Pests

☐ Bark Beetles

☐ Aphids

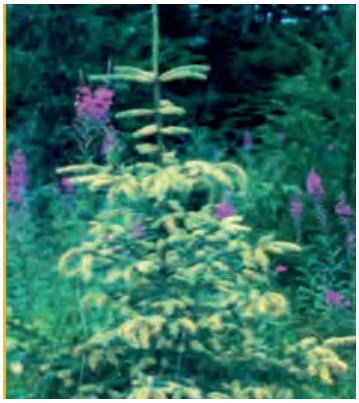


☐ Leaf Miners

☐ **Diseases**

There are indicators of infections such as fungal growths (conks), discolored fading or dead foliage. There are no signs of insect activity, bore holes, webs, pitch tubes or unusual bird activity such as woodpeckers foraging. There is extensive internal rot. Fallen trees may have extensive internal rot, and into the roots.

☐ Needle Rust or other fungal infection



☐ Root Rot

☐ Conks or fruiting bodies on the trunk or limbs (internal fungal infection)

Other Damage to trees not described above:

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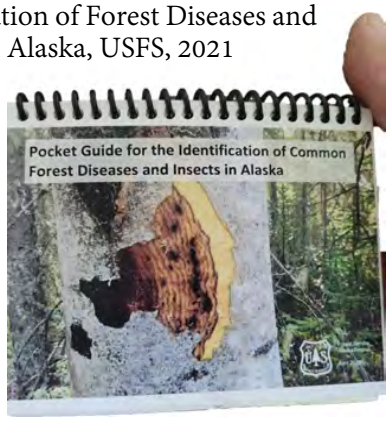
Insect & Disease Section

Observations of your trees, based on the previous page	Check the actions in this column that you want to carry out in order to mitigate insects and diseases.	Expected Results and Contributions to other Forest Management Goals
Bark beetle attacks	☐ Remove dead spruce trees from August through January and process them into firewood.	Fall/winter activities reduces spread of bark beetles benefiting Insect & Disease Control.
	☐ Retain Hardwoods, alder, willow and herbaceous understory vegetation and/or ornamental shrubs.	Remaining trees have more sunlight and space. Forest Health is improved.
	☐ Spray spruce trees in April with Sevin (Carbaryl) or Astro (Permethrin). Product application directions must be followed. Professional exterminator service is recommended.	Sprayed trees can be protected from bark beetles for up to two years. May be cost prohibitive for spraying numerous trees.
	☐ Ensure that beetle-killed trees retained for firewood are cut into lengths less than 24 inches and quarter split to promote drying.	Reduces ability for beetles to breed in firewood.
Dead or dying trees, all species Downed trees Other infestations and diseases, all tree species	☐ Remove dead trees if they are within striking distance of structures or power lines, as soon as possible. More distant trees can be removed at your convenience. ☐ Refer to the Pocket Guide for the Identification of Forest Diseases and Insects in Alaska, USFS, 2021  Link to Pocket Guide Contact the Division of Forestry Forest Health Office: 907-269-8460 jason.moan@alaska.gov Forest Stewardship Program trevor.dobell@alaska.gov	More sunlight and space available to surrounding trees. Forest Health is improved. Reduces wildfire fuels. Diseased trees are removed, reducing possible spread to other trees. Comprehensive guide for identifying and possibly mitigating the impacts. Needle rust seldom rarely kills trees, but can disfigure branch sections. Fruiting bodies or conks likewise do not kill trees but are an indicator of core rot in the trunk. Tree structure may be questionable. Aphids occasionally kill spruce trees.

Reforestation Section

Reforestation is establishing trees in an area where trees have been lost to fire, disease, logging, land clearing, etc. The trees may be established naturally or artificially by planting or seeding.

Growing new trees is often a means of accomplishing other forest management goals. For example, planting birch seedlings to replace mature spruce killed by bark beetles is one of the actions to mitigate the damage from future infestations, and to add to the species and age diversity on the property.

Natural reforestation requires less effort than planting, and entails allowing seeds to germinate. Although planting trees requires more cost, time and effort, planted seedlings are better able to overcome competition from grass and herbaceous plants if their planting sites have been adequately cleared.

Preparing Sites for Tree Planting (Site Preparation)

Scraping surface vegetation, moss, leaf litter etc., and exposing mineral soil, provides more opportunities for young trees to sprout. This process is called scarification. On a smaller scale, scraping away a spot to plant a small tree is also called scalping. Tree seeds germinate best on mineral soil than on moss or leaf litter. Site preparation can be carried out with heavy equipment over a large area or with hand tools on smaller projects. Selecting a planting site that is easy to clear from competing grass and vegetation gives planted seedlings a better chance for survival.

Clearing away competing grass with a shovel, known as scalping.

Scarifying a site with heavy equipment creates better sites for planting and creates optimum sites for natural seeding.

☐ Reforestation is a goal for the property. Methods of reforestation will include:

☐ Natural seeding or root sprouting.

☐ Transplanting local seedlings.

☐ Planting seedlings from nurseries.

Other ideas for reforestation on the property:

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Reforestation Section

Planting Basics

Grown in commercial nurseries, plug seedlings are produced by sowing seeds in individual cells containing soil. Roots and the planting medium form a plug that can packaged, stored and transplanted with less loss to the seedlings. Nurseries also offer bare root seedlings, which are sown, lifted, and bundled for shipping. Bare root seedlings are more prone to drying out and damage than are plug seedlings.

The simplest approach to reforestation by tree planting is to plant as many seedlings as you have on hand. The seedlings could be purchased from a nursery or are transplants from your property. The objective may be to replace trees that were lost to fire, infestation, wind, etc. or to simply plant trees on new sites. This approach is the most common with individual private landowners. Depending on the size of area to be planted, more time will be needed to reach reforestation goals.

Larger reforestation projects entail obtaining enough seedlings to cover specific sites on the property, in a single planting project intended to meet a reforestation goal. Planting density--the spacing between trees is pre-determined, and the planting sites are prepared for planting by clearing competing vegetation or other debris.

Adequate Drainage:

Spruce and birch favor sites that are well-drained with plenty of sunlight. It is therefore best to avoid sites that puddle water at any time of the year. Look for slightly raised sites, and near the tops of slopes, and southern exposures if possible.

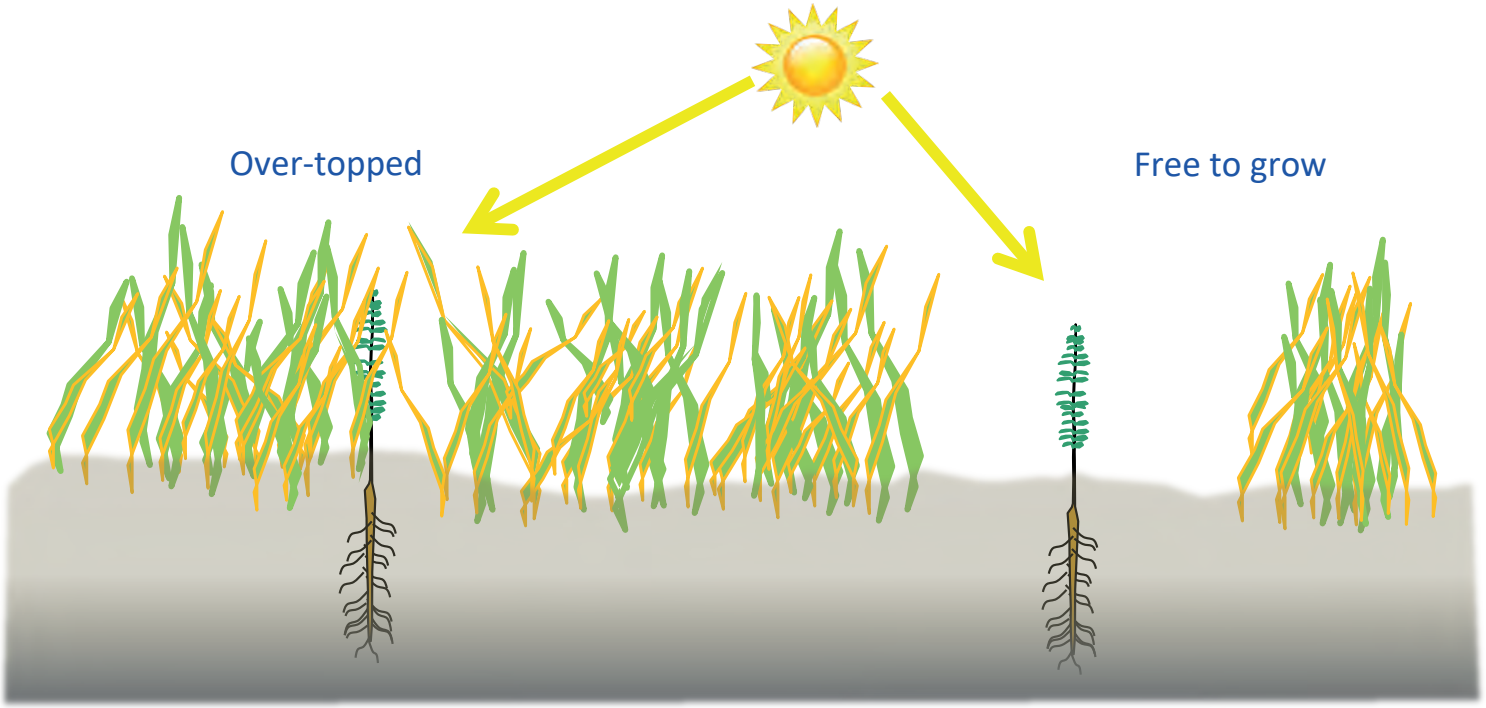
Mineral Soil:

Young trees need sufficient mineral soil to establish roots; the root systems are extracting necessary moisture and minerals found in mineral soil. The estimated depths of mineral soil are between three and six inches below the surface, especially if there is a thick surface layer of moss, dead leaves, or needle duff. Soil layers deeper than approximately six inches are likely to consist of sand, clay or silt mixtures with little organic nutrients. Organic soil can best be reached by disturbing the ground surface. This is called scarification. Scraping away the surface moss, needle duff and dead organic material exposes mineral soil and results in desirable spots for seedlings.

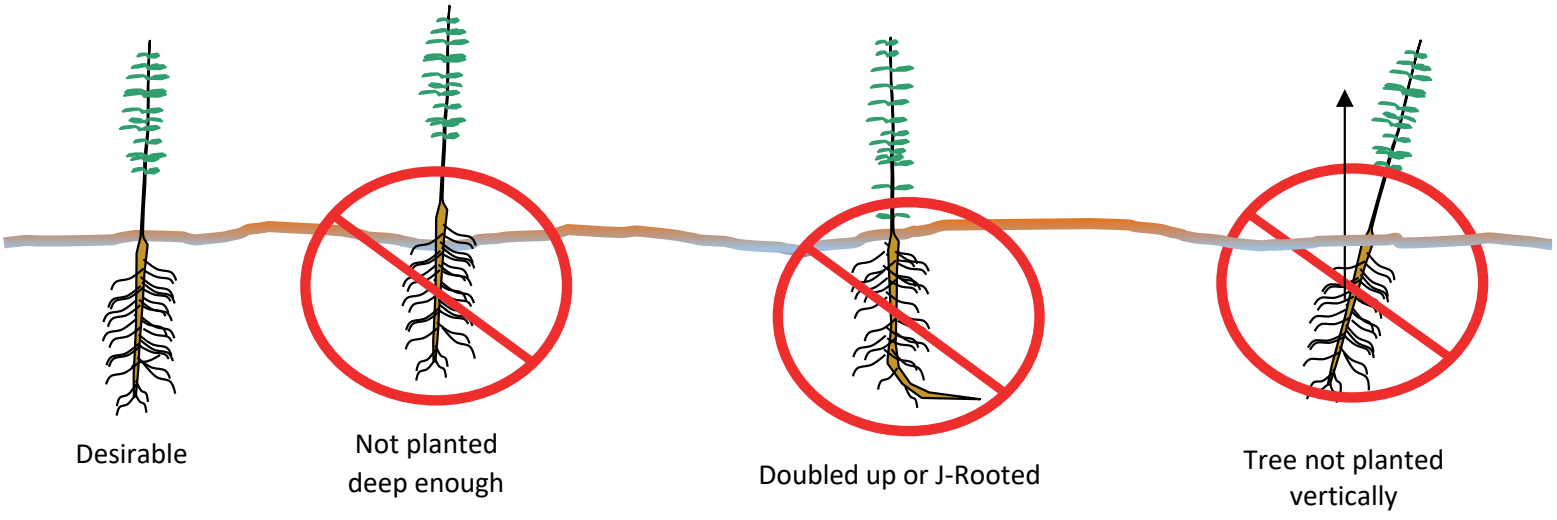
Free to Grow:

Young trees need adequate sunlight. However, they will be competing for sunlight against grass and brush. Therefore, clearing competing grass and brush away from each planted seedling is critical. After logging or a fire, this may be easy. However, planted trees will need to be monitored the following years to ensure that competing grass and brush are not over-topping the trees from the sun. A recommended clearance for each seedling is roughly a two-foot diameter area with the seedling in the middle. Once the trees are taller than the adjacent grass and brush, they are likely free to grow and will not require as much attention.

Reforestation Section



Roots Properly Set: Root plugs must be planted properly. Young root systems will be spreading into the planting area after planting. This requires the roots to be firm in the soil and oriented to spread through the organic soil layer. To do this, it is best to plant the seedlings as illustrated below:



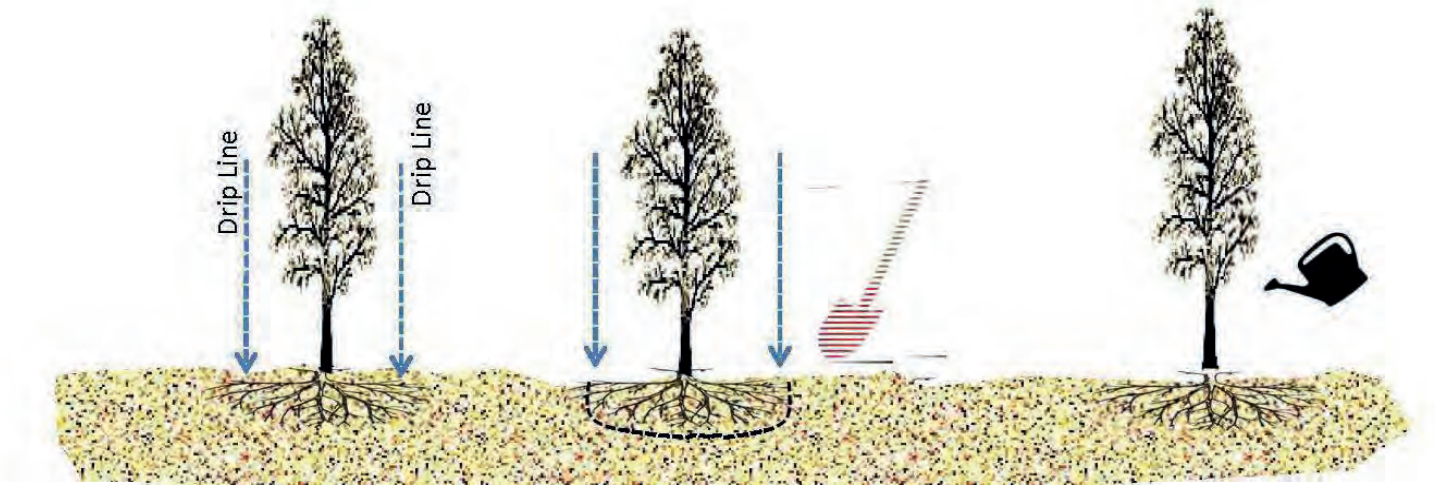
Reforestation Section

Difficult Planting Sites

Grass and brush overtop young trees. This deprives seedlings of sunlight, hindering, if not preventing their growth.

Saturated site. Even if the puddles dry out, the site may be too wet to support spruce, birch or aspen.

Transplanting Trees



1) Best times to transplant:
   Fall time as trees are going dormant and before frost sets in.
2) Spring, before buds break. Timing on this may be difficult in Alaska if spring breakup is delayed.

Dig up tree from the drip line or wider to capture as many of the hair roots as possible.

Water frequently for at least three days after transplanting. Mulch will help retain moisture

Reforestation Section

Incidental planting. On most small properties, adequate reforestation could entail planting seedlings to replace beetle-killed trees removed from the property, or filling in sites as a means of adding age and/or species diversity.

Large-scale Tree Planting

Planting a large batch of seedlings offers the opportunity to establish trees in a single operation. Due to complex logistics of ordering, shipping and planting hundreds of trees in Alaska, consulting with the Division of Forestry is highly recommended. The availability of seedlings in Alaska is historically limited due to lack of nurseries offering native tree seedlings. Lower 48 nurseries offer both bare-root and plug seedlings, but are rarely trees from an Alaska seed source. The main risk of planting seedlings from out-of-state stock is reduced chances of seedling survival. Tree species native to the cold climates of the Lower 48's may not thrive in Alaska.

Seedlings are planted at a pre-determined density, based on a desired number of trees within a unit of area, expressed as trees per acre. The spacing between planted trees will result in the desired density, as illustrated in the table below. Planting grids are not necessary for small planting projects and are usually done on tree planting projects with hundreds or thousands of seedling are to be planted and over a large area.

This approach to reforestation is well suited for reforesting sites that were cleared due to fire, bug kill salvage, wind-throw, or where new forest is desired (afforestation).

- Above all: Selecting quality sites for planting trees should override planting spacing. Good spots (i.e. microsites) to plant seedlings will not always fit a planting grid. Plant the trees in the best spots possible, even if it means deviating a foot or two from your planting grid.

Spacing Grid Table

Spacing Grid in Feet	Trees per Acre	Spacing Grid in Feet	Trees per Acre	Spacing Grid in Feet	Trees per Acre
5 X 5	1742	10 X 11	360	16 X 16	170
5 X 6	1452	11 X 11	360	16 X 17	160
6 X 6	1210	11 X 12	330	17 X 17	151
6 X 7	1037	12 X 12	303	17 X 18	142
7 X 7	889	12 X 13	279	18 X 18	134
7 X 8	778	13 X 13	258	18 X 19	127
8 X 8	681	13 X 14	239	19 X 19	121
8 X 9	605	14 X 14	222	19 X 20	115
9 X 9	538	14 X 15	207	20 X 20	109
9 X 10	484	15 X 15	194	20 X 21	104
10 X 10	436	15 X 16	182	21 X 21	99

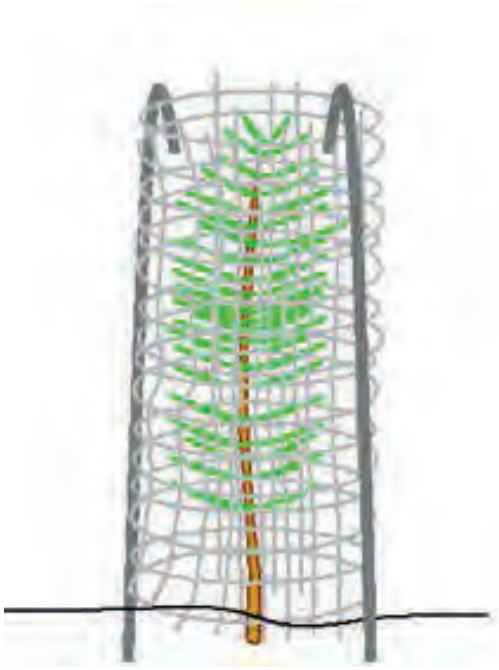
Reforestation Section

Seedling Protection:

Snowshoe hares are an ongoing browser of newly planted trees. Chemical deterrent sprays are formulated to taste and smell awful to browsing hares, deer and moose, thus reducing browsing. Their effectiveness diminishes with precipitation but are better than no protection. These spray products would need to be re-applied as rain washes the repellent off.

Physical barriers can be made by surrounding a planted tree with net-like plastic or wire mesh as a protective shroud. Both metal and plastic material will need durable stakes or metal T-posts to secure and keep the shroud upright.

Grass and brush will still need to be cleared from planted trees since matted grass overlaid with heavy snow can crush seedlings surrounded by a shroud. Attaching shrouds on larger trees and hardwoods is more effective and recommended for fruit or ornamental trees that still need protection until they are large enough to sustain browsing. Metal mesh is reportedly more effective against moose than plastic netting.



Avoiding Invasive Species

Due to the lack of tree seedlings grown in Alaska, it is tempting to purchase and plant trees available at local nurseries. This should be done very carefully to avoid purchasing invasive species. May Day (European bird cherry) and Siberian pea shrubs are two examples of invasive species that have proliferated in Alaska.

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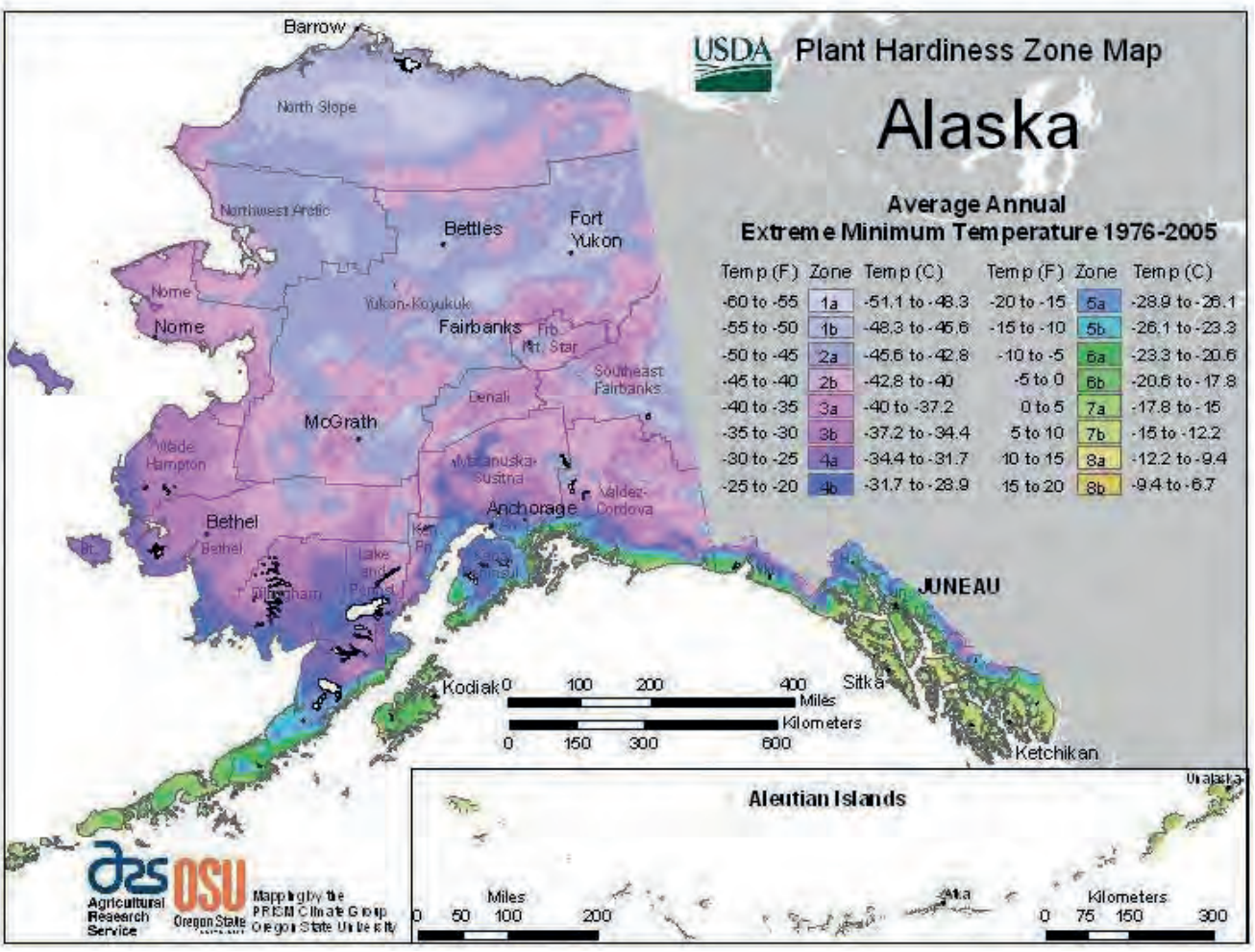
Reforestation Section

Naturalized non native tree such as lodgepole pine, Scotch pine and Siberian larch have been cultivated in Alaska for decades with no adverse impacts on forests. Another consideration when purchasing nonnative trees is their adaptability to Alaska. The USDA Plant Hardiness Zones Map for Alaska will help determine species compatible for the growing conditions of your property.



USDA Hardiness Ratings for Alaska Tree Species:

	Hardiness Zones		Hardiness Zones		Hardiness Zones	*Nonnative Species	Hardiness Zones
White Spruce	2 - 6	Western Hemlock	6 - 8	Black Cottonwood	3 - 6	Scotch pine	4 - 7
Black spruce	1 - 6	Mountain Hemlock	5 - 8	Balsam Poplar	1 - 4	Siberian larch	2 - 5
Sitka spruce	4 - 7	Eastern Larch	1 - 3	Paper Birch	2 - 7	Lodgepole Pine	4 - 8
				Aspen	1 - 7		

*Nonnative naturalized species have been widely planted in Alaska and naturally reproduce.

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Wood Utilization Section

Wood Utilization

Either utilizing wood on the property or making it available for others provides returns to the landowner by off-setting costs of timber harvest and making use of trees that offer value as firewood, and numerous other products.

Trees are being cut for creating defensible space, they are dead or infested with beetles.

☐ The trees will be processed for personal use:

☐ Firewood ☐ Lumber ☐ House logs

Other ideas for personal use of trees:

☐ The trees will be processed as commercial forest products:

☐ Firewood ☐ Lumber ☐ House logs

Other wood utilization ideas, forest products:

☐ The trees are to be removed with no plan to utilize the timber on the property.

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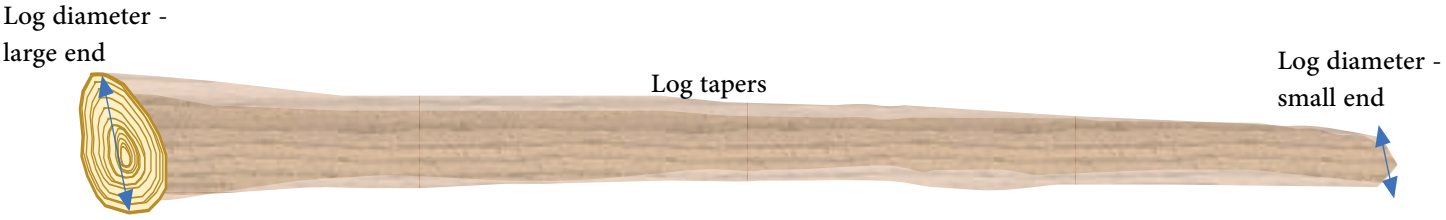
Wood Volume Information

Log Volumes

Calculating the volume of trees can be a highly complex process using equations that have been derived by carefully measuring logs of a particular tree species, at a particular location. The level of tree volume accuracy is usually based on the value of the timber. Issues with logs such as rot, splitting, crookedness (sweep) are evaluated and deducted from the volume as unusable pieces or cull. Cull in logs depends on the forest products in mind. Cracks, outer damage to the log, or crookedness may render a log unusable for rough-cut lumber, but acceptable for firewood.

1) Calculate the average diameter in inches of the butt (large) end of the log, and the top (small) end:

$$\frac{(\text{Diameter inside the bark - large end} + \text{Diameter inside the bark - small end})}{2}$$



2) Divide your diameters by 12 so that the area you calculate is in square feet.

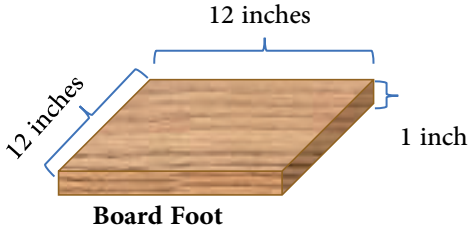
3) Divide the average log diameter by 2 to get the radius.

4) Multiply the radius times itself to get radius squared.

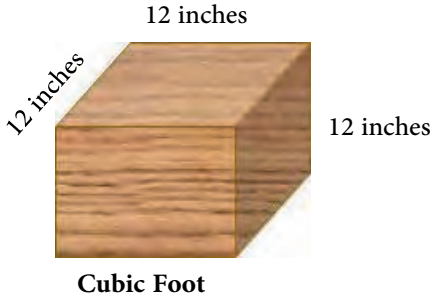
5) Multiply the radius-squared times 3.14.

6) Multiply the area times the length of your log to get cubic feet.

7) A cubic foot of wood = 12 board feet of wood.



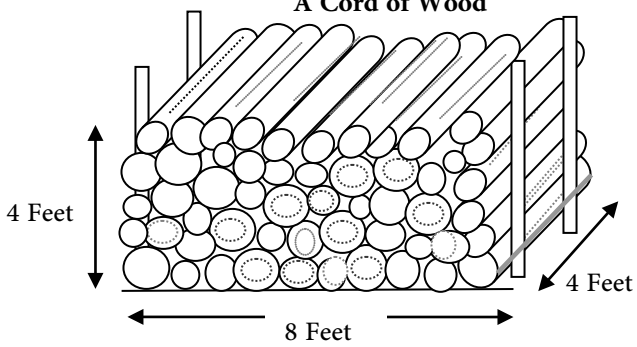
Board Foot



Cubic Foot

The above steps are a very basic method of estimating the volume of wood in a log, and is referred to in forestry as gross volume. A more accurate estimate of net wood volume is obtained by deducting the volume of material not desired as part of the final forest product. Rot, breakage, bark thickness, crookedness are examples of items that are deducted from a wood volume estimate. Wood volume estimation can be a highly specialized process, depending on the forest product in question. While the volume of firewood could be adequately estimated by the space it takes up in a truck bed, commercial lumber requires far greater analysis.

A Cord of Wood



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Privacy Screening Section

Privacy screening is creating effective visual buffers between the house, roadways and adjacent properties. Landowners frequently seek privacy screening, particularly if there are occupied adjacent properties and/or a road way with a full view of their house. Visual screening can also reduce sound and dust into the property. Planting or retaining a fringe of spruce trees in a line can provide the desired buffer.

Retaining visual screens are often a consideration for landowners who have thinned or removed trees from around their house in order to create defensible space from wildfires. Retaining spruce trees for visual screening can be done if the retained spruce trees are isolated from the surrounding forest due to the roadway on one side of the privacy screening or there is at least 30 feet of cleared space from the house.

However, spruce seedlings require at least 15 years of growth before they are large enough to provide the desired visual obstruction. Alder and willow are suggested species for creating hedges since they are native to the area and require far less time to grow into adequate visual barriers. Both brush species are also effective for slowing fire spread. However, willow is favored moose browse and may require protective fencing for several years.

- [ ] Privacy screening will be implemented by retaining a narrow fringe of trees between the house and the neighboring property and/or adjacent roadways.
- [ ] Privacy screening will be created by planting trees or brush species such as alder or willow along neighboring properties and/or adjacent roadways.

Removing spruce trees to create defensible space around structures could reduce the effectiveness of privacy screening. This can be remedied by retaining willow, alders and hardwood trees between houses and roads.

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Wildlife Habitat Section

Wildlife Habitat
Wildlife need food, water, and cover for protection and a place to reproduce.

These are excerpts from "Landscaping for Wildlife" by the Alaska Department of Fish & Game. Further information can be seen at:

http://www.adfg.alaska.gov/index.cfm?adfg=wildlifelandscaping.main

1. **Select your wildlife habitat area**
   Note locations of hazards such as power lines, exhaust systems, wire fences, roads, large windows, and other structures.

2. **List the types of trees and plants that are already on your property**
   This will help you identify which animals may already use your area, and which you are likely to attract. Which animals do you see here now? What birds are nearby?

3. **A "layered" landscape from ground cover to the tree canopy can attract a variety of wildlife.**

4. **Arrange your layered plantings in clusters, so that food, water, and cover can be found close together in several places throughout your area.** This will make your landscaping more attractive to wildlife in general.

4. **Obtain your trees, shrubs, plants**
   Ensure that purchased plants are not invasive species and are from preferably a local source and free of invasive species.

5. **Get your hands dirty and plant**
   For bushes and trees, refer to the section on transplanting trees and planting plug stock on page 27 of this plan.

6. **Monitor plantings for success**. Be prepared to attempt alternate species in the event of unsuccessful planting.

Compatibility with Other Forest Management Goals

Fire Protection
To create defensible space from fires, dense spruce must be thinned, pruned or possibly removed if they are too close to structures. Hardwoods, willow and alder can usually be retained without compromising defensible space and will add to wildlife cover, nesting habitat or food.

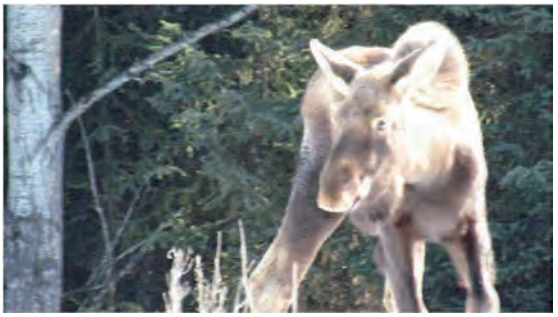
Wildlife Habitat Section

Privacy

While spruce thickets provide privacy screening, there are alternative brush species that will accomplish screening and be relatively fire-resistant. Alder and willow, for example can provide surprisingly dense privacy screening. Young starts can grow to sufficient size and density for privacy screening within 10 years as opposed to spruce seedlings that need 15 years to be effective visual barriers. Alder is well suited for privacy screening since moose do not browse it as much as willow. Therefore, no fencing is needed to protect young alders.

Reforestation

Propagating aspen or birch in lieu of spruce augments moose browse and will result in less fire-prone vegetation—a boon to fire protection. If kept more than 60 feet from structures, spruce trees provide cover for wildlife. Young trees of all species may need to be protected from browsing moose and snowshoe hare.



Potential Conflicts with other Goals

As can be expected with nature, complications are possible and wildlife habitat enhancements could lead to unwanted conflicts with various animals.

Planting a hedgerow of willow as a privacy barrier will attract browsing moose. If the willow is 100 feet from a house an occasional moose may be tolerable; 30 feet from a playground—potentially dangerous. Alders are less preferred by moose and can be an effective privacy barrier.

Leaving logs or brush piles creates cover for small furbearers. If they happen to be snowshoe hare, then an ambitious tree planting project could be seriously compromised, especially during a hare population peak, as hares feed heavily on young trees.

Leaving snags can provide roosts for a variety of birds and habitat for cavity nesters. However, snags should be a safe distance (two times the tree height) from structures, driveways and power lines.

☐ Wildlife Habitat is a goal for the property.

Your ideas for wildlife habitat:

Wildlife Habitat Section

Wildlife Habitat Protection

Perhaps there is already suitable fish and wildlife habitat on the property. If so, then another important goal is to ensure that forest practices carried out for other forest management goals do not harm fish and wildlife habitat.

For example, removing trees surrounding a house is necessary for creating defensible space from wildfire. However, tree removal may adversely impact fish habitat within streams and lakes. The Department of Fish & Game and local government agencies may require notification, review and permits for such activities as tree cutting within designated distances from streams, lakes, estuaries, etc. identified as habitat for salmon and/or resident sport fish. Contacting these agencies for permitting requirements is therefore recommended.

Water

☐ There are no streams or lakes on the property. There are therefore no potential impacts to water quality from forest management projects on this property.

☐ The property contains or borders a lake or stream.

☐ Forestry projects will need to be carried out in a manner that protects water quality. Protection from runoff, and the applications of pesticides, herbicides and fertilizers should avoid contaminating water.

☐ The property contains or borders a lake or stream identified by the Alaska Department of Fish & Game, and /or local government agencies as habitat for anadromous fish or high value resident sport fish and is subject to habitat protection requirements.

☐ I request assistance from the Division of Forestry or the Department of Fish & Game for determining if the stream is habitat or salmon or high-value resident sport fish.

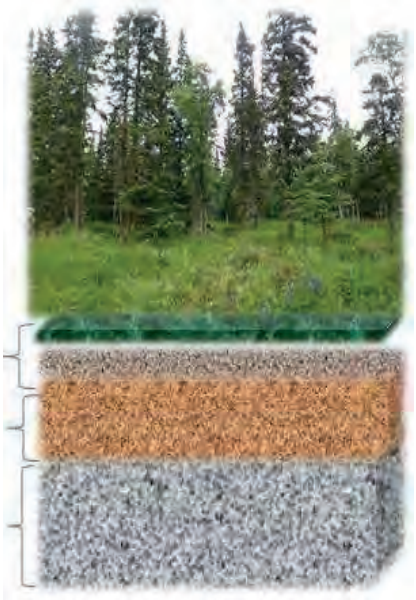
Environmental Factors that Influence Forests

Climate

Alaska's forests cover most of the state, except for a large portion of the Arctic. Most forests lie within the Interior, Southcentral, and Southeast Alaska. The Interior has a continental climate which means that winters are long and cold, yet summers are the warmest in Alaska. Wildfires are common each summer. By stark contrast, Coastal and Southeast Alaska has a maritime climate characterized by cool, wet weather. Southcentral Alaska has both characteristics of continental and maritime climates. Tree species, associated with the Interior, such as black spruce, thrive in Southcentral locations.

Soil

Like forests, soils lie across the landscape in mosaics of various types. Various types of rocks are broken down by wind, ice, water flow into gravel, sand and silt. Volcanic ash and decomposing vegetation contribute to the characteristics of soil. Alaska soils commonly contain varying particle mixtures of silt and sand to a lesser extent, clay.



The Natural Resources Conservation Service (NRCS) manages soil typing across the US, and maintains an interactive website called the Web Soil Survey. Check out this highly informative web site to learn more about soils on your land:

https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

☐ According to the Web Soil Survey, the soil type on my property is:

Enter soil type, if known

☐ I am not sure what soil type is on the property, but the soils have some of the characteristics below:

- ☐ Well-drained. Little ponding or surface flow during heavy rain. A variety of tree species thrive in the area.
- ☐ Saturated, standing water for extended periods, even during the summer. Frequent surface runoff during rains.
- ☐ Soil erodes and there are small gullies or rills.
- ☐ No trees except black spruce or larch (tamarack). Willow, sedges, deep moss and other species associated with wetlands present.

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Local Topography

Elevation above sea level:

Maximum slope on the property: --
Select from the Drop-down box

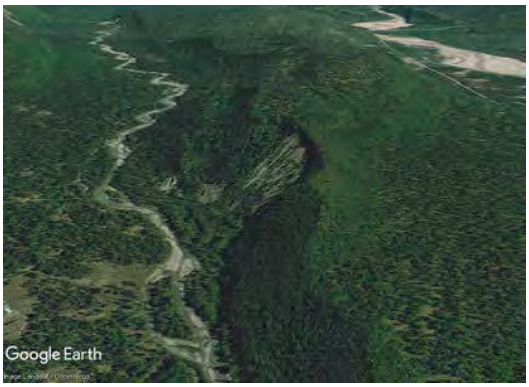
Aspect on the property influences sun exposure. In turn, this influences forest species.

Northwest	**North**	Northeast
West	**Flat**	**East**
Southwest	**South**	Southeast

Other Terrain Characteristics

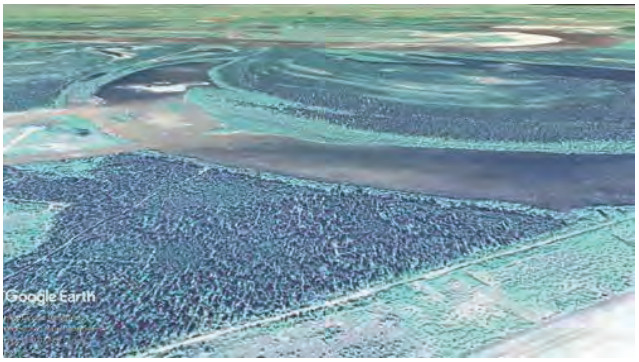
Steep Slopes:
Fires spread faster up slopes. Influence soil stability. Soils may erode more readily. Large trees may become more unstable especially if roots are shallowed.

Ridge Tops:
Fires burning up slopes have greater intensity. Structure protection may be more difficult against fire spreading uphill; adequate clearing of fire-prone spruce trees, tall grass and dead vegetation is critical.



Canyons, Draws and Narrow Valleys: Winds are often funneled and therefore increase, which greatly affects wildfires. Trees and other vegetation may differ depending on which side of the draw they grow on. Erosion is more possible

Flat terrain:
Soil is stable, unless the area is in a river delta prone to flooding. Winds are influenced by warmed air on a large surface rising by afternoon. This results in lightning and forest fires.



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Forest Description Section - Additional Forest Stand Information Page

So you think you have more than one forest stand on your property? If so, use this page to describe the additional stands that you have on your property. Identify the stands any way you like, as long as the names help you tell them apart.

Stand Name:

Check the species regardless is the stand is single/limited species or mixed species

☐ **Single Species Stand?**

☐ White Spruce ☐ Black Spruce ☐ Sitka Spruce

☐ Mountain Hemlock ☐ Western Hemlock ☐ Eastern Larch (Tamarack)

☐ Paper/Alaska Birch ☐ Quaking Aspen ☐ Cottonwood ☐ Balsam Poplar

☐ **Mixed Species Stand?**

What is the most common species in this stand?

☐ Uniform tree size?

☐ A variety of tree sizes?

Concerns about this stand and management ideas:

Stand Name:

Check the species regardless is the stand is single/limited species or mixed species

☐ **SingleSpecies Stand?**

☐ White Spruce ☐ Black Spruce ☐ Sitka Spruce

☐ Mountain Hemlock ☐ Western Hemlock ☐ Eastern Larch (Tamarack)

☐ Paper/Alaska Birch ☐ Quaking Aspen ☐ Cottonwood ☐ Balsam Poplar

☐ **Mixed Species Stand?**

What is the most common species in this stand?

☐ Uniform tree size?

☐ A variety of tree sizes?

Concerns about this stand and management ideas:

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Supplemental Information

Additional information about forestry and related topics are in the back of Your Forest Self-Study Guide as Supplemental Information.

Tree Thinning

Firewise Tree Pruning

Bark Beetle Information

Common Trees of Alaska

Glossary of Forestry and Forest Fire Terms

If you intend to send a copy of your plan to the Division of Forestry for their review, you do not need to send any of the Supplemental Information, only your plan, photos and any maps or diagrams that you may have created.

Useful Forestry Related Topics and Links:

Tree Health and Fertilization, University of Alaska Fairbanks, Cooperative Extension

http://cespubs.uaf.edu/index.php/download_file/1235/

Fertilization

Insect Pollinators of Alaska , USDA Natural Resources Conservation Service

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1361251.pdf

Pollinators

Selected Invasive Plants of Alaska2007 USDA

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev2_037726.pdf

Invasive Species

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Thinning

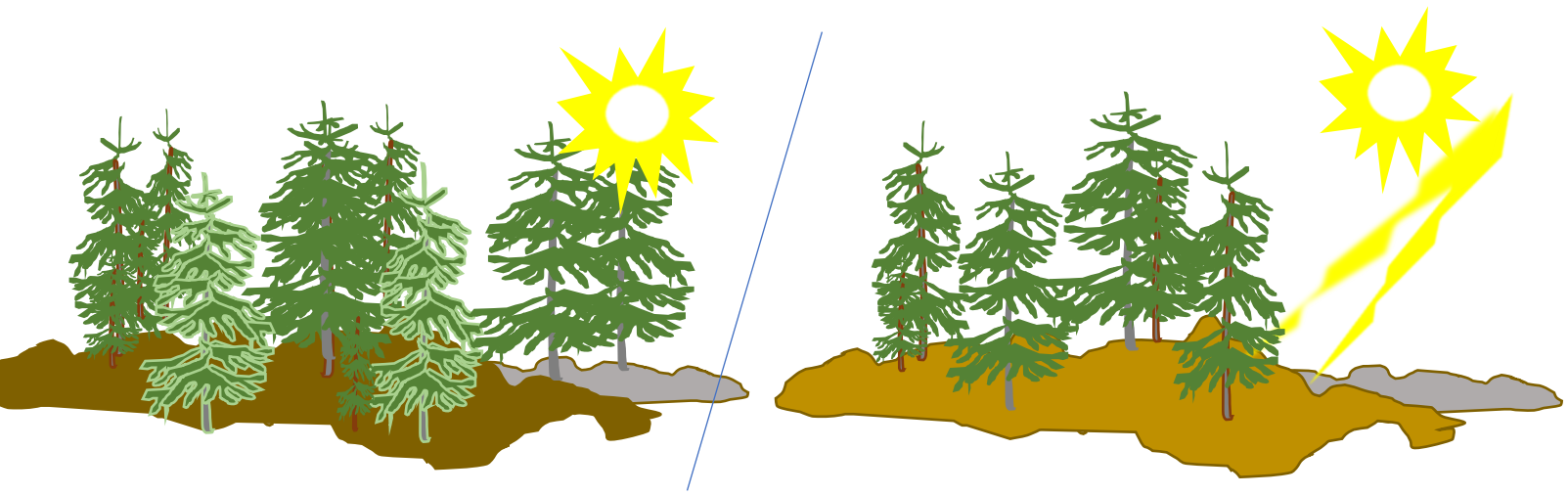
Dense stands of trees can result in low forest productivity. Trees thrive on sunlight and need sufficient space for roots to extend and effectively absorb soil moisture and nutrients. Crowded spruce trees may lack vigor necessary to resist insects such as bark beetles and are consequently attacked. Young trees growing in tight groups may develop tall spindly forms. Later in life, these trees are less wind-firm and can be more easily blown over. Removing overtopped and suppressed trees reduces the total amount of vegetation—or fuel—available to burn in a wildfire.

Thinning has long been considered a means of reducing the potential intensity of a wildfire and possibly render it easier to control. Wind and drought are dominating factors of wildfire spread and intensity, thinned forests could still burn under extreme fire conditions. However, the above-mentioned benefits of increased forest productivity (growth and vigor per tree) combined with reduced potential fire fuels, makes thinning a forest practice worth considering.

Selecting the right trees to keep is crucial. Thinning entails removing trees resulting in a more openly-spaced group of trees. Increased spacing per tree is a goal, but should not override the quality of trees left standing. For example, if a landowner decides to thin out a patch of young spruce trees so that the remaining trees are in an 8-foot by 8-foot spacing, and there are two prize trees 6 feet apart, leave both trees in place.

Cleanliness is another important consideration. Leaving pieces of cut trees lying around defeats the purpose of thinning as a fire-protection objective and can attract bark beetles during the summer months.

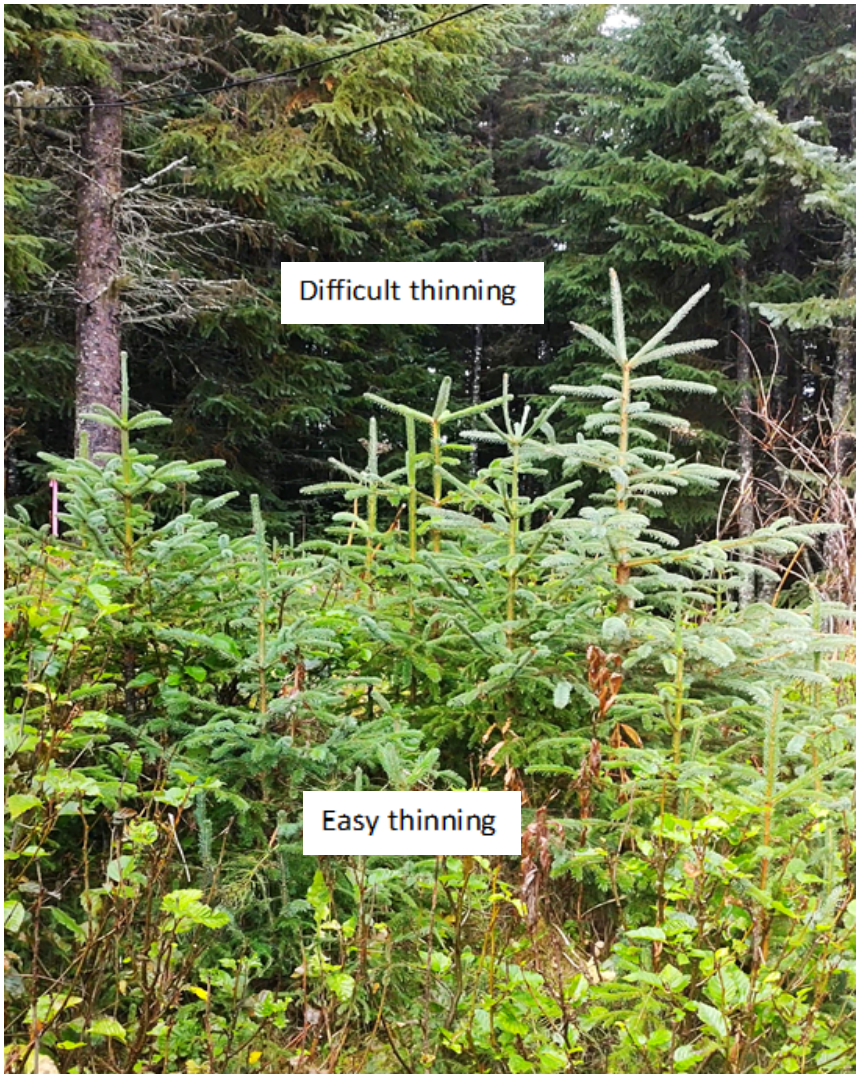
Often, trees that have grown in dense groups develop into tall spindly forms. This is a result of growing too close together and trees competing for sunlight. Thinning out tall spindly trees may result in trees prone to breaking or toppling in high winds. It is therefore highly recommended that you contact a professional forester to determine the best approach to thinning trees on your property.



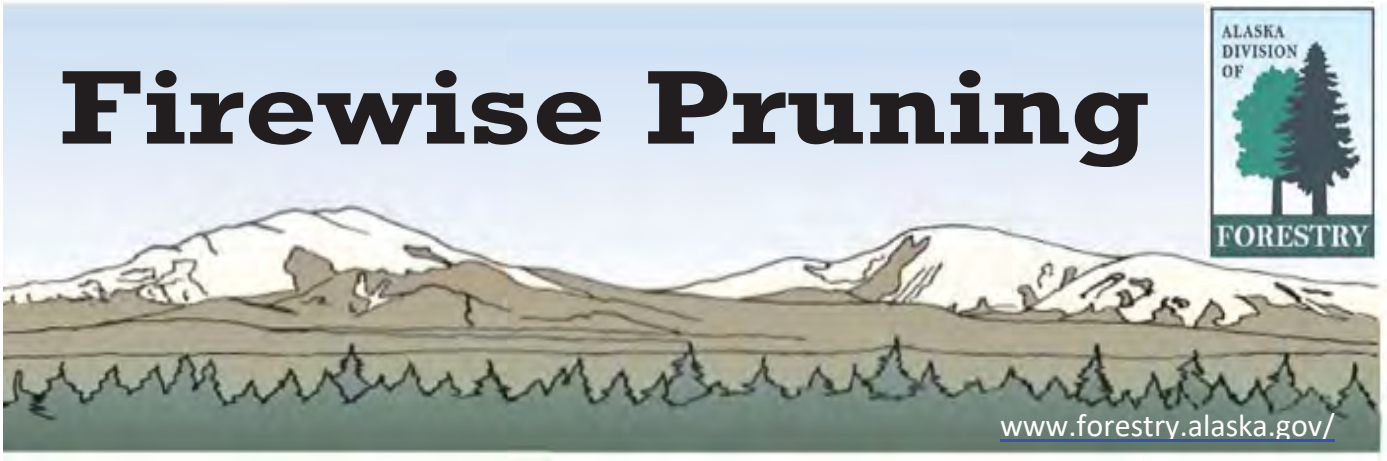
Thinning trees when they are young and small is easier, less expensive and results in physically sound trees. The large dense trees in the background will require equipment suitable for logging.

Foreground:
The smaller dense trees in the foreground could be thinned out using hand tools if a chainsaw is unavailable. The highest quality trees should be selected and smaller, malformed trees can be culled out. Spacing per tree requires examination from a professional forester. Absent available expertise, recommended thinning of the small trees in the foreground could be removing trees so that the limb tips of residual trees are two feet apart.

Background:
Thinning the large, dense trees in the background will require heavy equipment and logging expertise. Recommended thinning will be to start with removing the small, poorly formed trees in the understory, and leaving the tallest trees with good form. Trees in such dense stand often have narrow, spindly stems, and could snap easily in high winds. Determining appropriate thinning requires professional forestry expertise.



Firewise Pruning



Many Alaskans live or have cabins in areas where wildfire is a threat. Proper pruning can help you create and maintain a safe space around your home.

Pruning trees to remove dead branches and other ladder fuels is just one way to make your landscape Firewise. This fact sheet explains proper pruning techniques that will help keep your trees healthy, attractive, and safe from wildfire. For more help in making your home and landscape Firewise, see the Firewise Alaska booklet: www.forestry.alaska.gov/pdfs/06Firewise.pdf.

Proper pruning can improve the appearance and condition of a tree, however, keep in mind that every pruning cut is a wound and it can alter the growth of the tree. Trees do not heal as animals do; they grow over and compartmentalize wounds, which remain with the tree for the rest of its life. Making improper cuts can cause permanent damage.

Trees get their energy from food they make in their leaves through the process of photosynthesis. Every pruning cut that removes live foliage decreases the tree's ability to make food and energy to support itself and grow. It is important that no more than one quarter of the live foliage be removed in one growing season, so that the tree can produce enough energy to close pruning wounds, defend itself against insects and disease, and carry out life processes. If you have a smaller tree from which you want to remove lower branches to allow clearance or remove ladder fuels, it may take a few years and multiple prunings to achieve the desired final crown height.

The best time to prune trees is during the dormant season, or in the middle of summer. Avoid pruning during the spring when the trees are beginning to leaf out, and the fall when they are dropping leaves. Spruce beetle adults are searching for new trees to lay eggs in during mid May through mid August, so do not prune spruce during that time.

When removing long branches that are greater than two inches in diameter or those that you cannot easily support by hand it is best to remove the weight of the branch before making the final cut. This prevents the branch from splitting and the bark tearing causing injury to the branch collar and trunk.

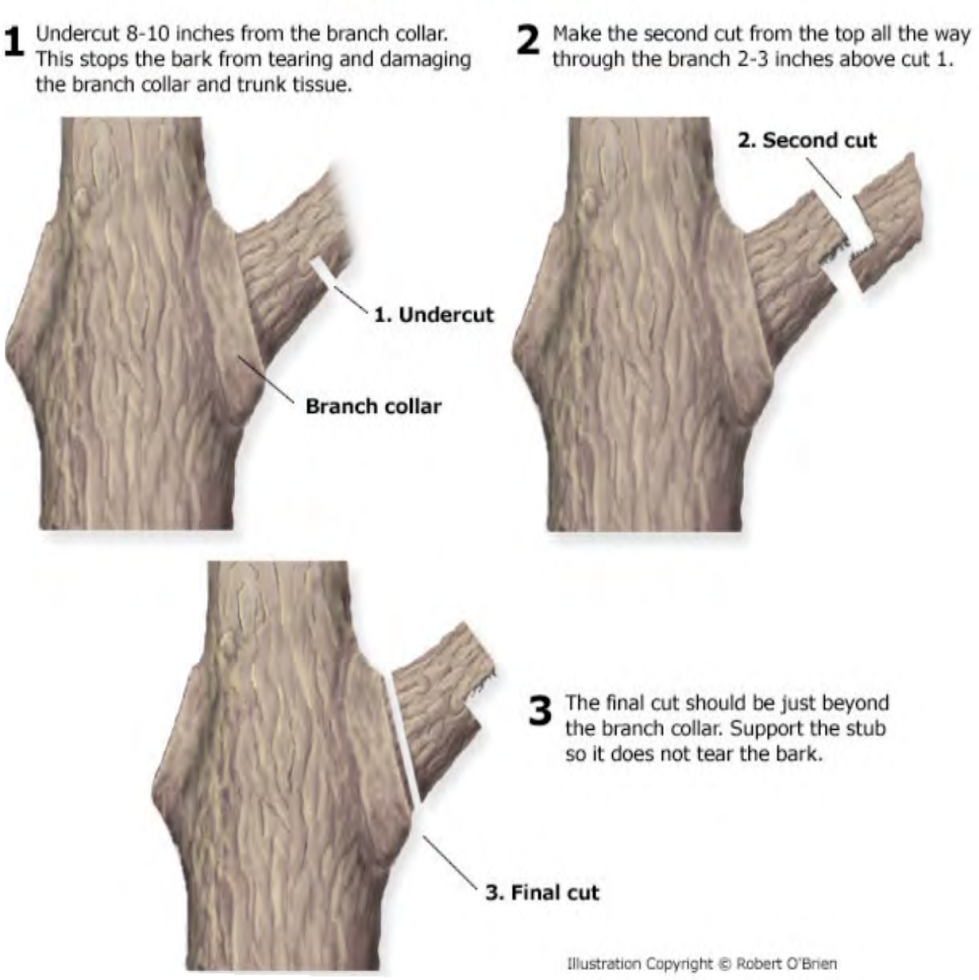
Make the first cut on the underside and a third of the way through the branch eight to ten inches out from where the branch attaches to the trunk or another branch. Make the second cut on the top of the branch, an inch or two further out from the first cut so that the branch snaps off leaving a stub. The third and final cut is made just outside the branch collar, the swelling at the base of a branch where it enters the trunk or a larger branch. The branch collar is the tree's defense zone against decay and should always be preserved in any pruning cut. When a proper cut is made, the collar will grow over the wound creating a circle of callous tissue and eventually seal the wound.

To reduce the length of a branch creating more space between trees and shrubs, shorten the limb back to another branch that is approximately the same size as the branch being removed. To make this cut properly you may need to remove the weight of the branch first. The final cut will be on an angle, almost parallel to the branch bark ridge (the ridge of bark in the crotch between the branch and stem). If it is necessary to remove more than half of the foliage on one branch, it is best to remove the entire branch.

Pruning can generate a lot of debris that should be disposed of properly so that it will not become fuel for a fire. It can be chipped and used for mulch or used as firewood and kindling. If you choose to pile and burn the material, consult your local fire department or Division of Forestry office for regulations, restrictions, and permits required before burning.

ZONES OF DEFENSE

Effective defensible space includes three zones of protection. For details about each zone, look to Firewise Alaska www.forestry.alaska.gov/pdfs/06Firewise.pdf and other publications on this topic. Below are important concepts for each zone.



ZONE 1: WITHIN 30 FEET OF STRUCTURE

Maintain deciduous trees and shrubs so that crowns are at least 10 feet apart to avoid the spread of fire from one to the other. Within this zone remove tree limbs within eight feet of the ground to prevent a ground fire from climbing into the canopy. Remove trees that are within 10 feet of your house and keep branches from at least 10 feet from the roof, chimney, or deck. All shrubs and groundcovers near buildings should be kept less than 18 inches tall. Remove all dead or broken branches and all dead or dying trees. Remove highly flammable plant material from this zone.

ZONE 2: 30~100 FEET FROM STRUCTURE

In Zone 2, maintain spacing of at least 10 feet between crowns. Limb trees up to 8 feet to help prevent a ground fire from tuning into a crown fire. Keep grasses short and space shrubs two to three times their mature height apart to break up the continuity of the fuels. They may cause a fire to burn at a lower intensity. Remove dead, dying, or unhealthy trees. Prune dead, rubbing, and broken branches from remaining trees. Limit the number of dead trees left as habitat snags in this area, as wildlife need only one or two per acre. Stack firewood away from trees and shrubs, and at least 30 feet from any structure.

ZONE 3: BEYOND 100 FEET FROM HOME

This is a transition zone between your defensible space and the surrounding area and extends to your property line. Pruning may not be necessary within this zone but you may wish to thin dense stands of trees, especially evergreens, and remove lower branches that are dead or could act as ladder fuels.

It is important that your access road and driveway be maintained to provide safe access for firefighters and their equipment. Clear vegetation from around street signs so that they are visible. Thin the number of trees along the driveway to maintain ten feet between crowns and remove dead or dying trees. Prune trees along the driveway and remove or shorten lower branches that could prevent fire fighting equipment from entering your property. Remember that they will need more room than the average sized vehicle.

FOR MORE INFORMATION

For more information about how to be Firewise visit the Division of Forestry's website at www.forestry.alaska.gov/ or http://www.firewise.org/ or call your local fire department.

For information about tree pruning and care visit the Alaska Community Forestry Program website at www.forestry.alaska.gov/community/ or see www.treesaregood.com/.

From: http://forestry.alaska.gov/insects/sprucebeetle

Natural Resources / Division of Forestry

WHAT'S BUGGING ALASKA'S FORESTS? SPRUCE BEETLE FACTS AND FIGURES

Forest Health Protection Links Menu

- Spruce beetles are only ¼ inch long.
- Spruce beetles infest Sitka, white and Lutz spruce (white/Sitka hybrid) most often and attack black spruce only rarely.
- Beetles live in the thin, phloem (growing) layer between the bark and the wood. Therefore, the wood remains undamaged by the beetles and useable for construction for some time.
- One female beetle may lay from 10 to 150 eggs in "galleries" constructed beneath the bark in the phloem tissue.
- A large, downed spruce tree may contain more than 100 beetles per square foot of bark.
- Beetles emerge from infested tree and fly to new host trees from mid-May until mid-July (when temperatures are above 60° F).
- Spruce Beetles feed and breed on wind-thrown, fallen or injured trees wherever there are spruce forests. When conditions are right, beetle populations may outgrow the supply of down trees and move into nearby living trees, especially mature spruce stands.
- Recent annual statewide aerial surveys have indicated that the ongoing spruce beetle outbreak in Southcentral Alaska has impacted more than 900,000 cumulative acres from 2016-2018. Statewide, nearly 600,000 acres of ongoing spruce beetle activity was mapped in 2018.
- Human activities such as fire suppression and improper disposal of slash enhance conditions for beetle outbreaks; as do natural occurrences such as wind-thrown, fire-scorched or flood-damaged trees.
- Fast growing, healthy trees are more resistant to beetle attacks than slow growing unhealthy trees.
- Beetles can emerge from infested firewood and attack living trees.
- Beetles produce chemicals called pheromones to communicate with other beetles – for mating, to locate susceptible host trees and to repel other spruce beetles. Spruce trees also produce chemicals that affect beetle behavior. These chemicals show potential for modifying beetle behavior and reducing the severity, or even preventing, damaging infestations.
- Some EPA-approved insecticides have provided 100 percent protection from beetle attacks for at least two years, based on research results.

- More detailed information about the spruce beetle can be obtained from a forest pest leaflet published by the USFS in response to the 1990s epidemic: spruce beetle FIDL #127

Spruce Beetles in Firewood

Spruce beetles attack and breed only in spruce. Birch, hemlock, aspen, cottonwood and other trees are not at risk. Spruce beetles spend most of their life in the phloem tissue between the bark and the wood of a host tree. Adult beetles emerge in the spring and bore through the bark of a new host tree. Female beetles excavate galleries in which to lay eggs. The newly hatched larvae create feeding tunnels at right angles to the larger egg galleries, where they complete their one or two year life cycle.

If numerous beetles attack the tree, the resulting brood can girdle and kill the tree. Spruce beetles prefer to attack recently windthrown trees, but they also attack and kill standing trees that are weakened or diseased. Slow growing and less vigorous trees are also attacked when conditions favor beetle dispersal.

Trees killed by spruce beetles are often used as firewood. During the first winter after infestation both larvae and adult beetles may be present under the bark. Adult beetles may also be under the bark around the base of the tree through the second winter, and may emerge the following spring. Two years after the attack, beetles have left the tree. A two-year life cycle is most common in South-central Alaska.

Adult beetles over-wintering under the bark of firewood emerge when warmer weather arrives and seek out new host material, often a valuable landscape tree near the woodpile. By examining spruce logs to be used for firewood, and following suggestions below, you may avoid spruce beetle infestations in your live standing trees.

Condition of spruce firewood and ways to reduce beetle populations:

Fresh log with green needles when cut; bark peels away from wood smoothly; wood not split.

- Store only enough firewood for a single winter’s use.
- Split into stove-size pieces to dry out; stack loosely or separate to allow maximum air circulation.
- Dry wood discourages new spruce beetle attacks.
- De-bark log to eliminate potential beetle habitat.

Fresh log with green needles when cut; visible beetle attacks on bark surface (reddish-brown boring dust and pitch globules); bark may peel smoothly; wood not split.

- Store only enough firewood for a single winter's use.
- Split into stove-size pieces to dry out; stack loosely or separate to allow maximum air circulation.
- This will dry out the larvae and their food source.
- De-bark log to eliminate larvae and habitat.

Dry log; rust colored or no needles present on tree when cut; some evidence of old beetle attacks or woodpecker activity; bark may adhere tightly or pull off in pieces.

- Split and use prior to next spring to kill adult beetles that will emerge at that time.
- Fire-scorch the outer portion of the bark, killing beetles beneath, but keep the bulk of the wood
- intact (messy, but intact) for future use.
- Consider preventive measures on surrounding live spruce trees.

Dry, old log or split wood; barks pulls off loosely

- Spruce beetles will not attack well-seasoned wood and are normally gone from trees that have been dead for more than one year (though beetles and other insects may enter the wood). Old wood, free of spruce beetles, is not a potential spruce beetle infestation source.

For more information:

Alaska Division of Forestry Forest Health Program
(907) 269-8460

Common Trees of Alaska

USDA United States Department of Agriculture

Prepared by Forest Service

Alaska Region
R10-XX-XXX
August 2009

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Western hemlock – *Tsuga heterophylla*

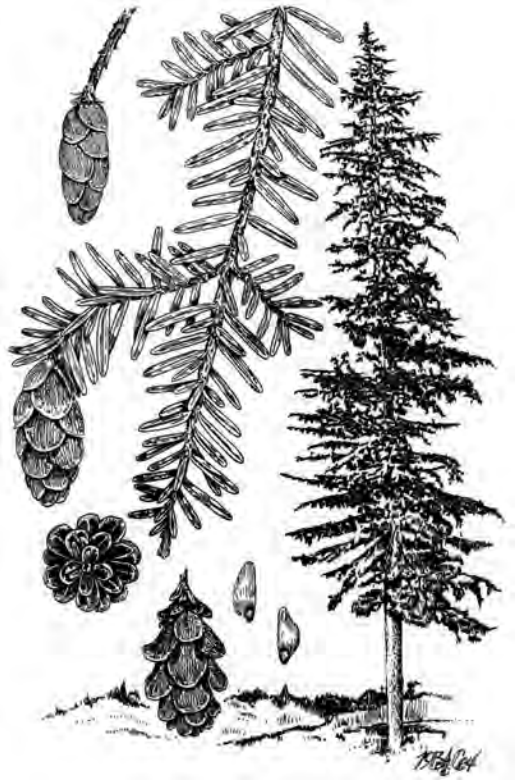
Needles
- Light- to medium-green on top, with two whitish parallel lines beneath, needles are unequal in length from 1/4 to 7/8 inch long;
- Blunt-tipped, soft, shiny, and flat, generally growing from two sides of branch parallel to the ground.

Cones
- Brown, oval-shaped, 5/8 to 1 inch long;
- Thin, papery scales.

Bark
- Reddish-brown when young, turning gray-brown;
- Scaly when young, becoming thick and furrowed with age.

Size at maturity and life span
- 100 to 150 feet in height and 2 to 4 feet in diameter;
- 200 to 500 years.

Habitat and distribution
- Sea level to subalpine areas;
- Along Coast Range in central California to the Kenai Peninsula of Alaska.



Western hemlock – *Tsuga heterophylla*

Mountain hemlock – *Tsuga mertensiana*

Needles
- Dark green, white lines on both surfaces, more-or-less equal in length, 1/2 to 1 inch long;
- Soft and growing from all sides of the branch in a bottle brush pattern.

Cones
- Purplish when young, brown when mature;
- Cylindrical, 1 to 2-1/2 inches long;
- Thin, papery scales.

Bark
- Divided into narrow flattened ridges, becoming thick and deeply furrowed with age;
- Gray when young, turning reddish brown with age.

Size at maturity and life span
- 50 to 100 feet in height and 10 to 30 inches in diameter, can be prostrate in alpine;
- Slow-growing trees, size 18 to 20 inches in diameter at 180 – 260 years;
- 400 to 500 years

Habitat and distribution
- Sea level to 3,500 feet elevation;
- From crest of the Sierra-Nevada in California to the Kenai Peninsula in Alaska.

Mountain hemlock – *Tsuga mertensiana*

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Alaska yellow-cedar *Cupressus nootkatensis*

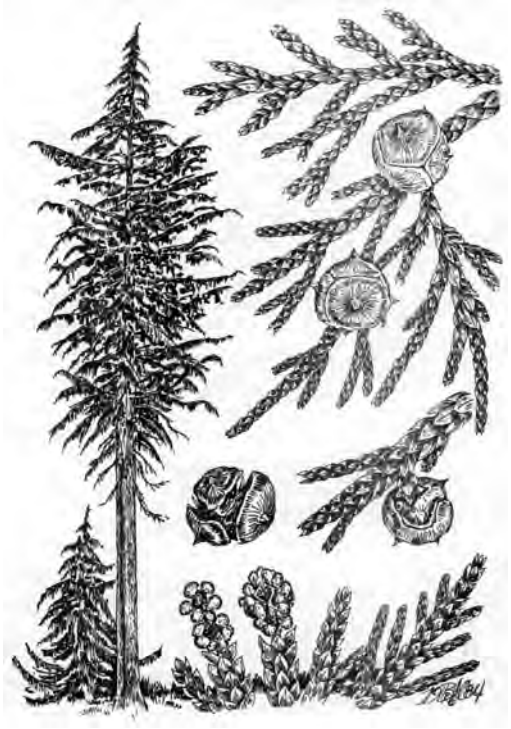
Needles
- Scalelike, overlapping, sharp pointed, 1/16 to 1/8 inch long;
- Yellow-green to deep green;
- Top and bottom of branch sprays similar, without apparent white stomate markings.

Cones
- Spherical about 1/2 inch in diameter;
- Green, maturing to brown in 2 years;
- Made of 4-6 shield-shaped scales, sharp central point on each scale, scales do not overlap.

Bark
- Shredding, grayish brown.

Size at maturity and life span
- Slow-growing trees;
- 40 to 100 feet tall, and 1 to 2 feet in diameter;
- Shrub-sized and contorted in bogs and at tree line;
- Lives up to 1,500 years.

Habitat and distribution
- Wetland and subalpine forests;
- Sea level to tree line;
- From Oregon north along coast through Prince William Sound, Alaska.



Western redcedar – *Thuja plicata*

Needles
- Scalelike shiny yellow-green. 1/16 to 1/8 inch long;
- Springy, fan-shaped sprays of branches, turning up at ends;
- Branch sprays flat and symmetrical, bottom side with white stomate markings.

Cones
- Brown, oval-shaped, 1/2 inch long;
- Clustered near end of branches;
- Cone scales overlap, woody, and curve outward at maturity.

Bark
- Fibrous and stringy;
- Cinnamon-red when young, becoming gray with age.

Size at maturity and life span
- 70 to 100 feet in height in Southeast Alaska (growing much taller in southern part of range) and 2 to 4 feet in diameter (occasionally reaching 6 feet);
- 300 to 700 years (occasionally 1,000).

Habitat and distribution
- Coastal forests;
- Sea level to 500 feet in elevation;
- From northwestern California to Southeast Alaska just south of Frederick Sound.

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Sitka Spruce – *Picea sitchensis*

Alaska's state tree

Needles
- Dark blue-green, squarish, 5/8 to 1 inch long;
- Needles sharp, growing on all sides of branches from woody pegs, a character common to spruce.

Cones
- Light orange-brown, 2 to 3-1/2 inches long;
- Usually found in the top quarter of tree, hanging down from branches;
- Papery scales.

Bark
- Thin and smooth when young, developing scaly plates with age;
- Gray, becoming dark purplish brown with age.

Size at maturity and life span
- 150 to 225 feet in height and 5 to 8 feet in diameter;
- Grows to larger size in southern part of its range;
- 500 to 700 years.

Habitat and distribution
- Well-drained, upland and riparian forests;
- Sea level to tree line;
- From northern California, northwest along the coastline to the Alaska Peninsula.

Sitka Spruce – *Picea sitchensis*

White spruce – *Picea glauca*

Needles
- 3/4 to 1 inch long, blue-green, four-angled with whitish lines on all sides;
- Rigid, pointed, but not sharp to the touch;
- Usually crowded on upper side of the branch.

Cones
- 1-1/2 to 2-1/2 inches long, light brown;
- Narrowly oblong, nearly stalkless, hanging down;
- Scales thin and flexible with smooth margins.

Bark
- Thin, scaly to smooth;
- Gray-brown, with white inner bark.

Size at maturity and life span
- 40 to 70 feet tall, 6 to 18 inches in diameter;
- Reaches 80 to 115 feet tall, 30 inches in diameter;
- Tree crown, narrow or spire-like;
- Can live an age of 250 to 300 years.

Habitat and distribution
- From sea level to tree line on a wide variety of habitats;
- Throughout southcentral and interior Alaska east through Canada to Atlantic Ocean, from the northern tree line south to the Great Lakes.

White spruce hybridizes with Sitka spruce where their ranges overlap, forming Lutz spruce, *Picea xlutzii*. It shows characteristics intermediate between the two parent trees.

White spruce – *Picea glauca*

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Black spruce – *Picea mariana*

Needles
- 1/2 inch long, light blue-green, four-angled with whitish lines on all sides;
- Blunt-pointed;
- Current year twigs with short red or brown hairs.

Cones
- 1 inch long, rounded and dark;
- Scales rigid and brittle, margins rounded to toothed;
- Stay on for several years, hang on short stalks.

Bark
- Thin, gray to blackish, becoming flaky with age;
- Inner bark is yellow.

Size at maturity and life span
- 15 to 30 feet tall and 3 to 6 inches in diameter, larger in ideal situations;
- Can reach 250 years in age.

Habitat and distribution
- Wet and cold sites on flats or north-facing slopes, also in bogs;
- Usually at lower elevations;
- Throughout southcentral and interior Alaska east through Canada to Alaska Ocean, from the northern tree line south to the Great Lakes.

Black spruce – *Picea mariana*

Shore pine – *Pinus contorta* var. *contorta*

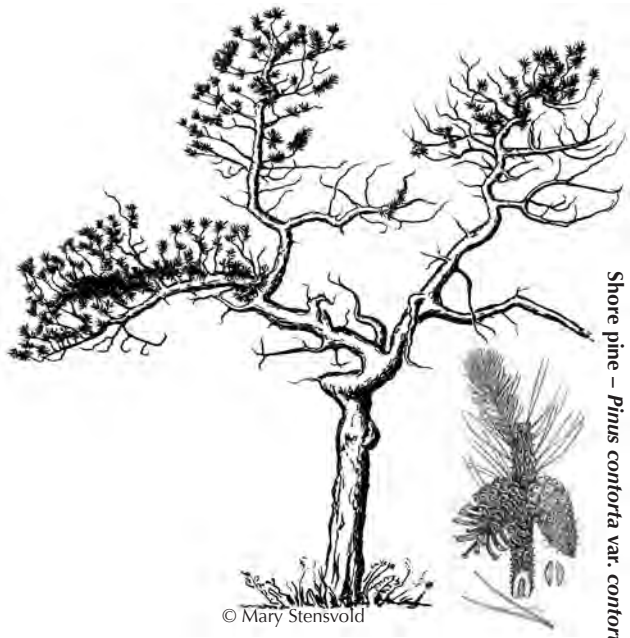
Needles
- 1 to 2-1/4 inches long;
- Two half-round needles in a bundle together making a cylinder when pressed together.

Cones
- Light brown, egg-shaped, 1-1/4 to 2 inches long;
- Woody, stiff prickles at the tip of each cone scale;
- Pointed backwards on branches.

Bark
- Dark brown to blackish;
- Resinous and scaly, becoming furrowed with age.

Size at maturity and life span
- Shrub-sized and contorted in bogs;
- Often a scrubby tree, 20 to 40 feet tall and 8 to 12 inches in diameter;
- To 75 feet tall and 18 to 32 inches in diameter on well-drained, sunny sites;
- Lives 200 to 600 years.

Habitat and distribution
- Abundant in and adjacent to bogs;
- Sea level to subalpine;
- From northern California to Yakutat, Alaska.



Shore pine – *Pinus contorta* var. *contorta*

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Tamarack – *Larix laricina*

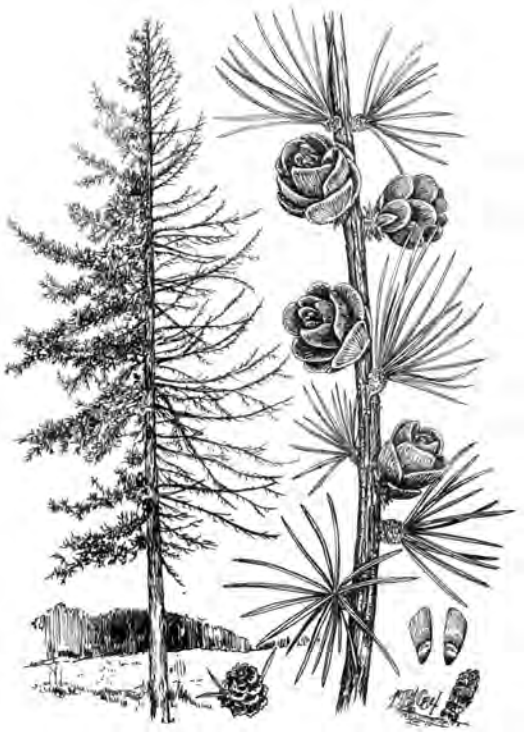
Needles
- Deciduous, soft, flexible, 1 inch long;
- In clusters of 10 to 20 on short spur branches;
- Blue-green needles turn golden yellow and are shed in the fall.

Cones
- 1/2 inch long, dark brown;
- With about 20 rounded, finely toothed scales;
- Held upright on short stalks from horizontal twigs.

Bark
- Young trees with dark gray, smooth, thin;
- With age becomes reddish brown, scaly, exposing darker inner layer.

Size at maturity and life span
- 30 to 60 feet tall, 4 to 16 inches in diameter;
- 100 to 200 years.

Habitat and distribution
- Bogs, moist places, and along river drainages;
- From the northern slopes of the Alaska Range to the southern slopes of the Brooks Range, east across Canada to Atlantic Ocean, from the northern tree line south to the Great Lakes.



Tamarack – *Larix laricina*

Paper birch – *Betula neoalaskana* (formerly *B. papyrifera* var. *humilis*)

Leaves
- 1-1/2 to 3 inches long, 1 to 2 inches wide;
- Broadly oval with long-pointed tip;
- Margins coarsely double-toothed;
- Yellow-green, paler yellowish-green underneath;
- Twigs with dense covering of resin dots.

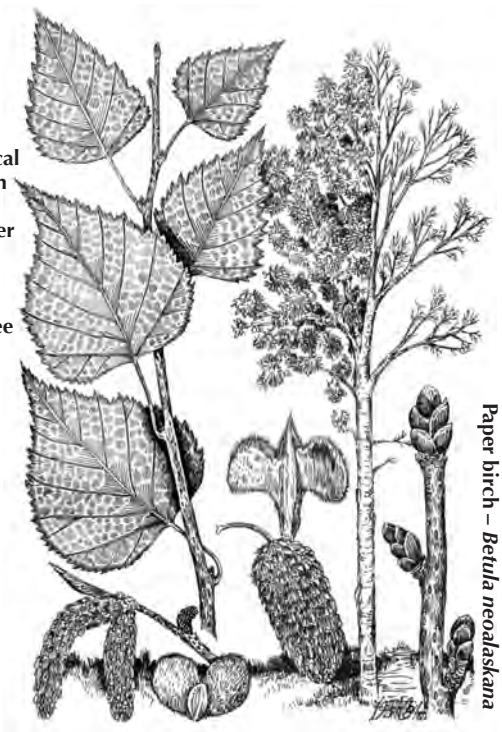
Fruit
- Nutlets borne in short, greenish-brown, dry, 1 to 1-1/4 inch-long catkins;
- Nutlets tiny, with wings broader than the body.

Bark
- Red-brown on young trunks;
- Lightens with age;
- Smooth, thin, paper-like and peeling.

Size at maturity
- To 80 feet tall, 4 to 24 inches in diameter.

Habitat and distribution
- Common in a variety of habitats, often in mixed forests with black and white spruce;
- From interior Alaska across northern North America to the southwest side of Hudson Bay.

Kenai birch (*Betula kenaica*) is nearly identical to paper birch except for slightly smaller size, leaves, and fewer resin dots on twigs. This tree is endemic to Alaska.



Paper birch – *Betula neoalaskana*

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Balsam poplar – *Populus balsamifera* subsp. *balsamifera*

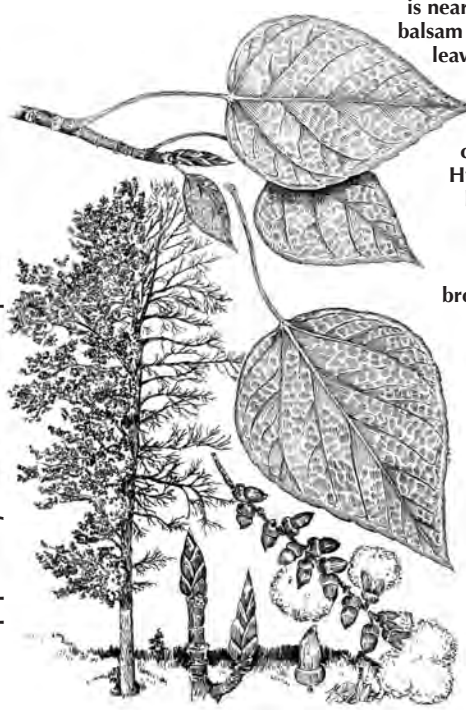
Leaves
- 3 to 6 inches long, 2 to 4 inches wide;
- Broad at base, narrowing to a point at the tip;
- Dark shiny green above, rust-colored underneath;
- Swelling leaf buds are sweetly aromatic in the spring.
- Fruit
- 2-parted capsules on 6 inch-long catkins contain numerous tiny cottony seeds.

Bark
- Young stems greenish to reddish brown;
- With age becomes thick and deeply furrowed.

Size at maturity and life span
- 80 to 100 feet tall, to 3 feet in diameter;
- 100 to 200 years.

Habitat and distribution
- River valleys and flood plains, alluvial fans, glacial outwash areas, lake shores;
- A shade-intolerant pioneer species;
- From interior Alaska across northern portions of North America.

Black cottonwood (*Poplus balsamifera* subsp. *trichocarpa*) is nearly identical to balsam poplar except leaves are whitish underneath and it grows in south-coastal Alaska. Hybridizes with balsam poplar where ranges overlap. This is the largest broadleaf tree in Alaska.



Balsam poplar – *Populus balsamifera* subsp. *balsamifera*

Quaking Aspen – *Populus tremuloides*

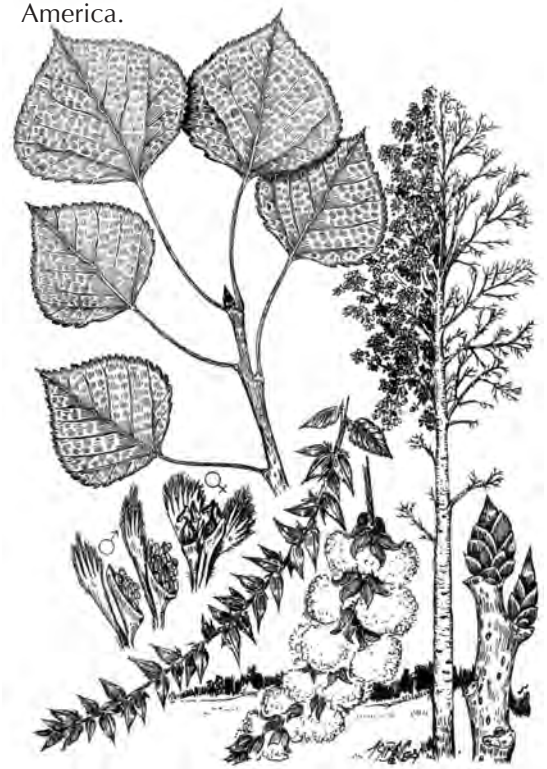
Leaves
- 1 to 31/2 inches long;
- Nearly round, pointed at tip and rounded at base, edged with many small rounded teeth;
- Shiny green, pale underneath;
- Leaf stalks flat, allowing leaves to tremble in the slightest breeze.

Fruit
- Capsules on 3 to 4 inch-long catkins;
- Capsules contain numerous tiny cottony seeds.

Bark
- Smooth, greenish white;
- Important wildlife food.

Size at maturity and life span
- 20 to 40 feet tall, 3 to 12 inches in diameter;
- 80 to 100 years average, 200 years maximum.

Habitat and distribution
- South-facing slopes and well drained benches;
- Propagates from root sprouting after disturbance;
- Throughout interior and southcentral Alaska, across Canada and south to New Mexico;
- Widest distribution of any native tree in North America.



Quaking Aspen – *Populus tremuloides*

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Red alder – *Alnus rubra*

Leaves
- 2-6 inches long;
- Elliptic to ovate, shallowly lobed with coarse, rounded teeth;
- Leaf margins rolled under;
- Dark green, minute rust-colored hairs underneath.

Fruit
- Look like tiny pine-cones;
- Seeds, tiny dry nutlets with two narrow wings.

Bark
- Thin, smooth, grayish;
- Often appearing white due to incrustation by pale, flat lichens.

Size at maturity and life span
- 20 to 80 feet tall, 4 to 25 inches in diameter;
- 60 to 90 years;
- Rapid growth when young, but short lived.

Habitat and distribution
- Along rivers, floodplains, open gravelly areas, disturbed areas to 1,000 feet in elevation;
- Often quickly colonizes disturbed areas;
- Most common hardwood on the Pacific coastline;
- From mid-California to Yakutat, Alaska.

Red alder – *Alnus rubra*

Scouler willow – *Salix scouleriana*

Leaves
- 2 to 5 inches long, and 1/2 to 1-1/2 inches wide;
- Wider above middle, short-pointed at tip, edges without teeth;
- Young leaves velvety hairy;
- Older leaves dark green, sparse white to rusty hair underneath;
- Crowded at ends of twigs.

Fruit
- Seed capsules long, slender, gray-wooly.
- Bark
- Smooth gray, becoming dark brown, divided into broad flat ridges.

Size at maturity
- Usually about 15 feet tall, 4 inches in diameter;
- Can grow to be 50 to 60 feet tall, 16 to 20 inches in diameter.

Habitat and distribution
- Colonizes burned-over areas, thrives away from water;
- Forms thickets, often found along forest edges;
- A fast-growing, short-lived pioneer;
- From interior Alaska east to Saskatchewan and south to New Mexico.

Scouler willow – *Salix scouleriana*

Alaska spans a vast array of ecosystems from open, wind-swept tundra bordering the Artic Ocean, and Bering Sea through expansive boreal forests of the Interior to impressive temperate rain forests along the Pacific Coast.

Tree composition changes with the prevailing climate across the state. In the Interior, principal species include white spruce, birch, and quaking aspen on uplands, black spruce and tamarack in forested wetlands, and balsam poplar within floodplains. Willows are abundant in the Interior as well, however most do not reach tree size.

The coastal temperate rain forests of southcentral and southeastern Alaska are comprised mainly of western hemlock, and Sitka spruce. Mountain hemlock, Alaska yellow-cedar, western redcedar, and shore pine are most often encountered where soils are more poorly drained. Deciduous trees are uncommon in the temperate rain forests of Alaska, and are represented mainly by red alder and black cottonwood.

This brochure was produced by the Alaska Region Ecology and Botany Programs.

Glossary of Forestry, Ecology and Firefighting Terms

Some of the forestry terms are derived from: Helms, J. A. 1998. The Dictionary of Forestry. Society of American Foresters 224pp and Smith, D.M. 1986 The Practice of Silviculture, 8th ed. John Wiley and Sons, New York. 527 pp.

A

Acre: a unit of area equaling 43,560 square feet or 10 square chains.

Apical dominance: The upward growth of terminal shoots of a tree, and is at the expense of the lateral growth of branches. It is essentially how trees get taller.

B

Basal area (BA): the cross-sectional area of a single stem, including the bark, measured at breast height (4.5 ft or 1.37 m above the ground)

Biodiversity: The variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms, including the relative complexity of species, communities, gene pools, and ecosystems at spatial scales that range from local through regional to global

Blowdown: tree or trees felt or broken down off by wind

Board foot: the amount of wood contained in an unfinished board 1 in thick, 12 in long , and 12 in wide, abbreviated bd ft

Burn Permit: A permit issued the Alaska Division of Forestry which provides the required conditions for burning debris by open piles, burn barrels, lawns or fields. The permit is required from April 1 to August 30—Alaska's official fire season.

Burn Permit Suspension: Burning covered under a State Burning Permit is suspended by the Alaska Division of Forestry due to high fire danger.

Burn Closure: A closure of open burning ordered by the Commissioner of the Department of Natural Resources due to large-scale wildfires in the state and exceptionally high fire danger

C

Cambium: a layer of living, meristematic cells between the wood of a tree

Cavity trees: living specimens of poor quality which as a result of low vigor and or broken branches allow invasion of decay insects and fungi, leading to the formation of decay cavities used by wildlife

Canker: a disease of the bark and cambium that causes a usually well-defined sunken or swollen necrotic lesion

Cavity nesting bird: bird species that carve holes in dead, standing trees excavating holes large enough to nest in. Cavity nesting also refers to bird species that burrow into the sides of dirt banks.

Chain: a unit of length, a surveyor's chain equals 66 feet or 1/80-mile

Clearcut: the cutting of essentially all trees, producing a fully exposed microclimate for the development of a new age class

Climax species: in forest ecology, the last—or climax--tree species to dominate the overstory of a forest. They usually propagated in the understory of other species that were occupying an area after a disturbance (seral species), and emerged as the dominant species. Disturbances may include fires, windstorms, diseases, infestations, etc.

Codominant tree: a tree whose crown helps to form the general level of the main canopy in even-aged stands or in uneven-aged stands, the main canopy of the tree's immediate neighbors, receiving full light from above and partial light from the sides

Cohort: a group of trees developing after a single disturbance, commonly consisting of trees of similar age, although it can include a considerable range of tree ages of seedling or sprout origin and trees that predate the disturbance

Commercial thinning: any type of thinning producing merchantable material at least equal to the value of the direct costs of the harvesting

Community: an assemblage of plants and animals living together and occupying a given area

Composition: The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand

Conk: the visible fruiting body of a wood-destroying fungus which projects to some degree beyond the substrate (i.e. tree stem)

Coppice: to cut the main stem (particularly of broadleaved species) at the base or to injure the roots to stimulate the production of new shoots for regeneration

Glossary of Forestry, Ecology and Firefighting Terms

Cord: a stack of fuelwood, pulpwood or other material that measures 4 x 4 x 8 ft, or 128ft3

Cover: any vegetation that shelters wildlife from predators or climatic extremes

Cover type: an assembly of the same plant species that can be spatially defined (i.e. mapped). In forests, there is one or a mix of tree species that form the canopy, and predominate herbaceous as the most plentiful surface vegetation in the understory of the trees.

Cubic foot: a unit of true volume that measures 1 x 1 x 1 feet

D

Diameter at breast height (DBH, dbh): the diameter of the stem of tree measured at breast height (4.5 feet) from the ground

Defensible space: the area surrounding structures that has been cleared of burnable vegetation thus protecting structures from a passing wildfire.

Disturbance: any relatively discrete event in time that disrupts ecosystem, community, overpopulation structure and changes resources, substrate availability, or the physical environment

Dominant: an individual or species of the upper layer of the canopy

E

Ecoregion: a contiguous geographic area having a relatively uniform macroclimate, possibly with several vegetation types, and used as an ecological basis for management or planning

Ecosystem: a spatially explicit, relatively homogenous unit of the earth that includes all the interacting organisms and components of the abiotic environment within its boundaries

Evacuation: a managed retreat by citizens from a possible or actual disaster, such as a fire, or storm. The evacuation is coordinated with responding forces

Even-aged stand: a stand of trees composed of a single class in which the range of tree ages is usually +/- 20 percent of rotation

Glossary of Forestry, Ecology and Firefighting Terms

F

Falling / felling: Cutting trees down.

Fire behavior: the overall intensity, speed, direction and resistance to control of a wildfire. Fire behavior is affected by weather, topography and vegetation (fuel).

Fire Intensity: the amount of heat and energy released by a fire. Favorable weather (hot dry windy), topography (steep or in draws) and fuels (dry vegetation) all influence the intensity of a fire.

Firewise: a national program recognized at the local, state and national level for educating and assisting homeowners at creating defensible space on their property to protect structures.

Forest: an area of land covered by trees and undergrowth.

Forestry: the science of developing, caring for, or cultivating forests.

Forest Practices: activities associated with accessing or harvesting timber, planting or seeding trees, developing recreation facilities, improving wildlife habitat

Forest Practices Act: statutes of the State of Alaska that govern logging and related activities that protect water quality, fish habitat and require growing back of trees on forested land.

Frass: a mixture of wood dust particles left by bark beetles mixed with sap excreted by trees as a reaction to boring or engraving insects. Frass is an indicator of beetle activity.

G

Gallery: networks of tunnels engraved by beetles into a tree's woody tissue. They can be used for nesting eggs.

Gap: the space occurring in forest stands due to individual or group tree mortality or blowdown

Germination: The beginning of growth of a mature, generally dormant seed, spore, or pollen grain

Glossary of Forestry, Ecology and Firefighting Terms

Girdle: to make more or less continuous incisions around a living stem, through at least both the bark and cambium, generally with the object of killing the tree

GIS: Geographic Information System, which uses the communication from satellites to produce spatial information used for mapping

Growing stock: all the trees growing in a forest or in a specified part of it, usually commercial species, meeting specified standards of size, quality, and vigor, and generally expressed in terms of number or volume

H

Habitat: the place, natural or otherwise, (including climate, food, cover, and water) where an animal, plant, or population naturally or normally lives and develops

Heart rot: decay concentrated at the core of a tree caused by various pathogens. They cause loss of structure and loss of wood value

 **Helitack:** a means of responding to a wildfire by transporting fire crews by helicopter.

Hybrid: the offspring or progeny of two different species breeding. Lutz spruce is a hybrid of white spruce and Sitka spruce.

I

Infestation: concentrations of insects or microorganisms attacking trees. Usually refers to large-scale attacks stands of trees and is beyond occasional, isolated attacks (endemic).

Intermediate tree: a tree whose crown extends into the lower portion of the main canopy of even-aged stands or, in uneven-aged stands, into the lower portion of the canopy formed by the tree's immediate neighbors, but shorter in height than the codominants and receiving little direct light from above and none from the sides

Inventory: an accounting of trees, their characteristics of interest and associated vegetation that takes place over a well-defined land area.

J

Jack-straw: an informal term for trees that have been pushed over in a jumbled manner.

J-roots: a root that is bent into a J-shape because the seedling was improperly planted in a hole or slit that was too shallow or narrow

L

Ladder Fuels: branches on conifer trees that extend in whorls from the tree trunk from the top of the tree to the ground. Consequently, the trees can be burned by fire igniting branches close to the ground. Related: See pruning

Live crown ratio (LCR): the ratio of crown length to total tree height

M

Mature: pertaining to a tree or even-aged stand that is capable of sexual reproduction, has attained most of its potential height growth, or has reached merchantability standards

Mechanical thinning: the thinning of trees in either even-aged or uneven-aged stands, involving removal of trees in rows, strips, or by using fixed spacing intervals

N

Niche: the place or role that a species has in its environment and how it relates to other organisms in that environment.

O

Overstory: the portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer, e.g., in a two-storied forest, seed-bearers over regeneration , or standards over coppice

P

Pitch: natural resins often exude from wounds and are obtained commercially by tapping or extraction with solvents

Pole timber: A tree of a size between a sapling and a saw timber tree. Hardwood trees ranging in size from 5 to 11 inches diameter at breast height (dbh), and conifers ranging in size from 5 to 9 inches dbh.

Precommercial thinning: the removal of trees not for immediate financial return but to reduce stocking to concentrate growth of the more desirable trees

Pruning: the removal, close to branch or collar or flush with the stem, of side branches (live or dead) and multiple leaders from a standing tree – note pruning is generally done on plantations to improve the tree or its timber, or on urban and rural trees to improve their aesthetics or health

R

Regeneration: seedlings or saplings existing in a stand

Release: a treatment designed to free young trees from undesirable, usually overtopping, competing vegetation

Rhizome: A modified stem that grows below ground, commonly stores food materials, and produces roots, scale leaves, and suckers irregularly along its length and not just at nodes.

Root collar: the location on a plant where the primary vascular anatomy changes from that of a stem to that of a root

Rust: a fungal plant disease. Some rust cause yellowish discoloration of spruce; others cause dense clumps of deformed branches called brooms. Spruce broom rust fungi require two hosts: spruce trees and the bearberry or kinikinik plant.

S

Sap rot: decay in the outer layers of a tree stem and is usually in dead trees.

Sapling: a young tree larger than a seedling but smaller than a pole

Sawlog: a log that meets minimum regional standards of diameter, length, and defect, intended for sawing

Saw timber: trees or logs cut from trees with minimum diameter and length and with stem quality suitable for conversion to lumber

Seed bed: the soil or forest floor on which seed falls

Seed tree: a tree left standing for the sole or primary purpose of providing seeds

Seedling: a usually young tree smaller than a sapling, grown from a seed

Senescence: the process of ageing. The changes that occur in a tree as it nears the end of its life cycle, including less vigor and ability withstand infections or insect attack.

Shade tolerance: the capacity of trees to grow satisfactorily in the shade of, and in competition with, other trees

Shelterwood: the cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment

Silvicultural system: a planned series of treatments for tending, harvesting, and re-establishing a stand - note the system named is based on the number of age classes (coppice, even-aged, two-aged, uneven-aged) or the regeneration method clearcutting, shelterwood, selection, coppice, coppice with reserve) used

Silviculture: the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis

Site: the area in which a plant or stand grows, considered in terms of its environment, particularly as this determines the type and quality of the vegetation the area can carry - notes sites are classified either qualitatively, by their climate, soil, and vegetation, into site types, or quantitatively, by their potential wood production, into site classes

Site index: a measure of potential forest productivity (site quality, usually for even-aged stands), expressed as an average height of trees within a specified time period. It is a numerical index that reflects site quality for a specific tree species; it is often addressed in discussions of soil types.

Site preparation: hand or mechanized manipulation of site, designed to enhance the success of regeneration. Manipulations may include removing unwanted vegetation, or ground surface material to expose mineral soil, which promotes propagation of target species by seeding or planting.

Skidding: dragging trees or logs by means of a machine

Slash: the residue, e.g., treetops and branches, left on the ground after trees have been cut down for logging or otherwise removed from the site.

Snag: a standing, dead tree from which the leaves and most of the branches have fallen

Square Foot: a unit of area equaling 144 square inches.

Glossary of Forestry, Ecology and Firefighting Terms

Stand: a contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit

Stand density: a quantitative measure of stocking expressed either absolutely in terms of number of trees, basal area, or volume per unit area or relative to some standard condition

 **Spot fire:** wild fire caused by a burning ember from a larger fire carried through the air by wind or fire convection and landing on ignitable material such as grass or dead leaves.

Stand structure: the horizontal or vertical distribution of a forest stand, including the height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags, and down woody debris

Stocking: an indication of growing-space occupancy relative to a pre-established standard

Stratification: the exposure of seed to a cold, moist treatment to overcome dormancy and promote germination

Stump sprout: Regeneration of shoot growth from either adventitious or dormant buds from a cut tree stump

Succession: the gradual supplanting of one community of plants by another

Sucker (Root Sprout): Shoots arising from below ground level either from a rhizome or from a root

Sustainability: the capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use

T

Thinning: a silvicultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover material potential mortality.

Glossary of Forestry, Ecology and Firefighting Terms

Timber Sale: Trees sold by an agency or private land owner from the land they own or manage. Trees are sold to individual buyers through direct negotiations or may be placed at auctions. Timber sales are often used as a means to recover value of trees, and to accomplish forest management objectives that would be met by harvesting timber.

Torching: fire burning a tree from the ground to the top. Related terms: ladder fuels and pruning. Pruning a spruce tree removes ladder fuels from a tree so that a fire will not torch up the tree.

U

Understory: all vegetation growing under an overstory

Uneven-aged stand: a stand with trees of three or more distinct age classes, either intimately mixed or in small groups

V

Vegetative regeneration: trees sprouting from roots or bases of parent trees/

W

Witches broom: dense, matted clumps of branches that occur in all three species of spruce trees in Alaska. They resemble brooms; hence the name “witches broom” or “broom”. Brooms are caused by the fungus.