

# Forest Assessment

## Prepared for Summer Village of Burnstick Lake



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## INTRODUCTION

Summer Village of Burnstick Lake participated in a Forest Assessment Project supported by AREF and ASVA to evaluate the current state of the forest within their environmental and natural reserves. **The Forest Assessment was completed on April 22, 2022.**

### Scope of Work

- 1) Collect field data and background information on current state of forest.
- 2) Develop tree/forest assessment, including the following key components:
  - a) Tree species description
  - b) Forest health assessment
  - c) Forest biodiversity and succession assessment
  - d) Estimate of forest floor fuel load for fire protection purposes
  - e) Pest identification
- 3) Provide recommendations
- 4) The work excluded tree assessment on private property.

### Goal

The goal of this assessment is to provide an assessment of the current state of trees and forest (health, vigor, biodiversity, risks) and provide options for management of a forest. Proper management will result in sustainable, resilient, and diversified forest vegetation. This work will also support the community's desire to meet the environmental and conservation objectives of their Municipal Development Plan (MDP)

### Objectives

- Evaluate and record the current tree/forest structures and healthy.
- Evaluate wood fuel load and risk of forest fires.
- Identify potential management activities such as harvesting, tree planting, fire suppression and disease management to improve forest.
- Identify potential management of biodiversity in area.

## LAND DESCRIPTION

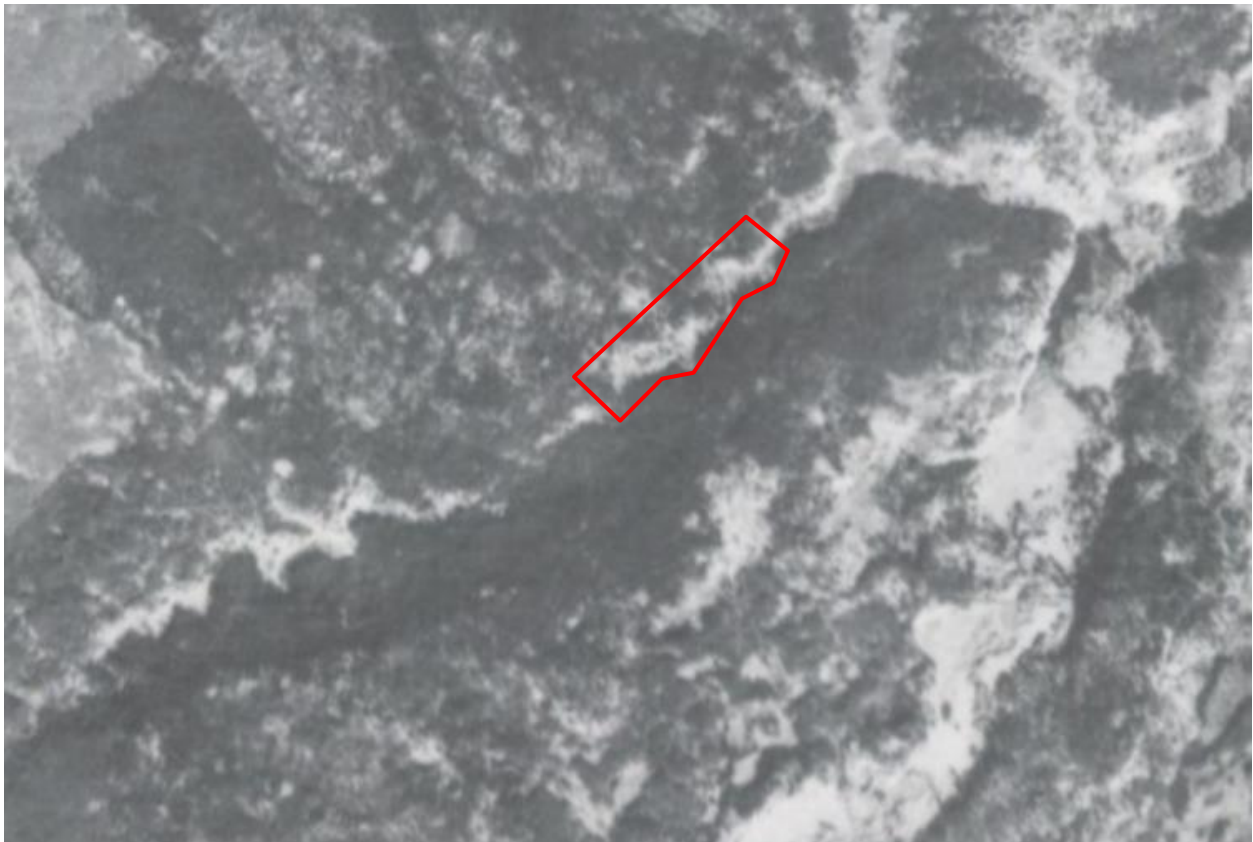
### Location

Summer Village of Burnstick Lake is an incorporated municipality located on the north side of Burnstick Lake, approximately 21 kilometers south/west of the town of Caroline. The summer village is located within Clearwater County.

### History of Property

The Summer Village of Burnstick Lake is fortunate to have a well-planned municipal reserve and open space system, which was an integral part of the original subdivision design and designated as Natural/Environmental Reserve. These public areas are for both passive and active recreation. In addition, there is municipal reserve area along the lakeshore between the lake and the residents' property.

Prior to 1937 the land belonged to the Province of Alberta. The circa 1949-51 aerial photograph below shows some key features of the Summer Village. There was road allowance to the lake that went through the Summer Village. The summer village was surrounded by forest with few openings along the lake area.



Picture 1. Orth photos of Summer Village of Burnstick Lake circa 1949-51

## FOREST DESCRIPTION & AREA SPECIFIC RECOMMENDATIONS

Summer Village of Burnstick Lake is within the Boreal Forest Natural region and on border between the Dry Mixedwood Subregion and Lower Foothills Subregion. Because of its transitional location between two subregions and mostly not disturbed habitat, this part of the of two Subregion supports a medium to high diversity of plant and animal life. These ecological subregions have been called the most productive of the boreal and foothills regions for wildlife, mainly because of the diversity of habitats available within it.

Summer Village of Burnstick Lake is surrounded by forested land. Mixedwood of coniferous species (white and black spruce, lodgepole pine, and fir )are the dominant forest types. There are no signs of previous forest fires within Summer Village of Burnstick Lake. However, in 2006 forest fire raged just north of Summer Village. Forest fire was out of control for several days and swept through 877 hectares of mature timber on Crown Land.

The Summer Village is dominated by even-aged pine, spruce and aspen forest stand with access to water nearby and could be considered to have medium to high biodiversity. In general, the age of Summer Village of Burnstick Lake forest can be classified into two (2)distinct age structures with the majority of the forested area at mature stage. A mature forest is between 80-100 years of age. A young spruce and aspen trees in understory of mature forest is between 0-30 years.

Forest area is dominated by lodgepole pine (45%), white spruce (50%) and aspen (5%) and few scattered black spruce and possible subalpine fir trees. There is only one non-native willow planted in the public areas.

There is one forest stands: Environmental/Municipal Reserve. Forest and trees on private property are not part of the assessment but forest is same as in municipal reserve.

## Environmental and Municipal Reserve Area

**Forest:** Mature mixedwood coniferous tree species

**Forest type:** Even age Lodgepole pine and white spruce with scattered aspen and few black spruce

**Tree species mix:** 45% pine 50% white spruce 5 % aspen and few black spruce and fir trees

**Age:** This stand is between 85 to 100 years of age

**Average Height:** 50 to 70 feet

**Average DBH (diameter at breast height):** 6 to 20 inches in DBH

**Understory vegetation:** the understory vegetation is dominated by Canada buffalo-berry, and Labrador tea, common bearberry, ground juniper, honeysuckle and prickly rose in the open area as well as chokecherry and pin cherry.

This forest is at maturity stage and is healthy. Tree density is good for the forest of this age. Lodgepole pine trees are healthy with no sign of MPB on it. White spruce is very vigorous with no signs of insect or diseases. The understory white spruce is healthy and vigorous growth. Aspen trees are healthy with few trees infested by aspen trunk conk. There are very few trees that are dying or dead and may pose a risk hazard to surrounding properties or people using the trails. There are no signs of previous forest fires. Several recent lightning scars were observed on pine trees. FireSmart was performed few years ago. The trails in the area provide good access for fire crews in case of fire. Throughout the area there are few old stumps that indicate tree removal at various times. There are very few logs on forest floor.

There were few signs of insect and disease damage on mature trees. Understory vegetation has been grazed by ungulates. This stand provides critical and important wildlife habitat for many species that like mature and healthy mixedwood coniferous stand. This stand also provides critical support for the healthy riparian areas along the lake. It reduces potential erosion while providing shelter and food for many wildlife species.

### Recommendations/Suggestions:

- Removal of very few dead, decadent, dying and danger trees nearby homes
- Cut few alive aspen trees to stimulate root suckering resulting in increase of hardwood species and diversify age of forest
- Mountain Pine Beetle (MPB) is not present yet but in near future may infested all pine trees. Preparation for pine removal will be necessary
- At the Alder Avenue island consider to plant native tree and shrubs such as paper birch, subalpine and Douglas fir, tamarack, alder, Saskatoons, pin cherry and chokecherry
- Monitor overall health of the stand especially after major storms, droughts, or pest infestation
- Proper tree hazard risk assessment of mature and large trees in close proximity to houses and buildings maybe be considered.
- Avoid introducing ANY invasive tree or shrub species such as caragana, Russian olive, common buckthorn, salt cedar just to name a few.



Picture 2: Mixedwood of pine and spruce with scattered aspen trees is most dominant forest on public as well as on private forest

### Riparian Areas

"Riparian Area refers to any land that adjoins or directly influences a water body. They are the place where water and land meet and interact and provide crucial ecosystems services valuable to all Albertans"<sup>1</sup>.

Riparian habitats are important in the ecology of a variety of fish and wildlife species. Forested riparian areas are important because they often provide a combination of water, forage and cover. Naturally vegetated riparian areas increase the value of water for fish by stabilizing shorelines.

They also reduce the amount of sediment that goes into ponds, lakes and streams. Sediment can damage spawning habitat, which can reduce spawning success and lead to lower fish populations. Shoreline vegetation also provides shaded areas that can reduce heat stress in fish.

Riparian area is also an extremely important wintering habitat for wildlife as they often have abundant forage and cover. Consequently, these areas are highly important to a variety of wildlife species.

Summer Village of Burnstick Lake needs to know that water and watersheds are defined in law as a public resource. All activities around water or adjacent to water bodies may require approval from government agencies. In Alberta, the Water Act regulates all activities related to water. Please see more information on: <https://www.alberta.ca/water-legislation-and-guidelines.aspx>

### Recommendations/Suggestions:

- Consider long term plan for restoration of riparian area by using Alberta Environment "Stepping Back from Water"<sup>1</sup> guide for Riparian area,
- The Alberta Riparian Habitat Management Society, also known as "Cows and Fish", can also provide expertise on for management of riparian areas

## ADDITIONAL RECOMMENDATIONS/SUGGESTIONS

In the Summer Village of Burnstick Lake, lodgepole pine and white spruce are at mature stage. If a forest fire or harvesting activities do not occur to encourage the regeneration of the forest, within the next 20 to 40 years the older forest will eventually break up and die due to age related mortality, insect infestations, and fungi diseases.

### Tree Removal/Harvesting

As identified earlier in the report some aspen tree removal may be considered. This may encourage new regrowth. Small selective cuts of a few aspen trees would introduce younger trees that will diversify the age while improving the wildlife habitat.

You may consider the following actions:

- Cut few alive aspen trees to stimulate root suckering
- Select and mark trees to be removed prior to any harvest activity to ensure healthy trees are not removed
- Remove dead, decadent and danger trees
- Do not harvest trees during high fire hazard season
- Avoid harvest during rain or wet periods so as to not damage soils
- On-site tree mulching to reduce DWM and disposal costs
- Use of wood chips for trail improvement

### Forest Regeneration

Natural regeneration is usually the lowest cost method of forest renewal. The naturally regenerated forest will originate from natural seeding or root suckers. Hardwood species like aspen or balsam poplar produce seeds every year but most reproduction occurs from roots (root suckering). As pine and white spruce are the most abundant species, natural regeneration through seeding is the most effective regeneration.

#### Forest Regeneration Recommendation/Suggestions:

- Cut few live aspen trees to stimulate root suckering
- During times of high white spruce seed production, consider disturbing soil area to allow white spruce seed to better establish on soil.
- Distribute educational information about trees. This may include articles and technical information on trees, pests, tree planting, pruning, etc. for staff and general public

### Fire Protection

Fire is a natural process of the forest ecosystem. There are two ways to look at forest fire: it is destructive in nature but on the other hand it provides beneficial effects. As a destructive force, a fire will damage buildings, homes, soil, timber, wildlife, watershed, aesthetic, and recreation resources. At times, these features become part of the fuel and contribute directly and indirectly to the difficulty and cost of controlling the event.



The beneficial role of forest fires includes creating seedbeds, opening cones to release seeds, recycling nutrients locked in the vegetation, controlling insects and diseases, reducing competition to seedlings from heavy grass and shrub cover, and to rejuvenate wildlife habitats.

Wildfires can result from both natural and human causes. Generally speaking, there are two type of forest wildfires; crown fires and surface/ground fires. Crown fires move and burn tree canopy moving from one tree top to next. Surface/ground fires burn materials laying on the ground or just above ground. The most common material laying on ground are dead logs, stumps, dead tree limb, grasses and forbs. Ground fires moves at slower pace than crown fires and are easier to fight. Slope is also very important factor to consider as fires moving up a slope move faster than in flat areas.

The most likely human cause is mismanagement and accidents of fire from using various equipment (such as chainsaw, vehicles, quads) and from firepits. Forest fuel (dead logs, branches, twigs, needles) found on the ground during this tree assessment pose low risk for forest fire. However, there are a few dead trees laying on the ground that need to be removed to reduce potential of fire spreading or ignition.

The Burnstick Lake Forest area would be classified according to Canadian Forest Fire Behavior Prediction System (CFFBP)- Fuel Types Descriptions – as **C3 – Mature Lodgepole Pine and M1 – Boreal Mixedwood fuel type**. Constant monitoring, education and awareness is very important to reduce the risk of forest fires.

From a natural cause standpoint ( lightning), this forest could be considered medium to high fire risk, mainly due to high percentage of coniferous trees. Of course, the highest probability for forest fire comes potentially from residents using fire pits or equipment during the fire season. There is a small amount of dead wood material (DWM) on the forest floor that has to be considered as fuel load. Cleaning up the DWM will reduce the risk of ground fires.

Overall, Summer Village of Burnstick Lake is at medium to high risk of forest fire due to forest composition that is dominated by coniferous species. Future tree mortality of lodgepole pine due to MPB infestation will further increase risk of forest fires. As in 2006 forest fire on Crown Land; Summer Village of Burnstick Lake is part of larger continuous forested area which increases risk of forest fire.

#### **Fire management recommendation/Suggestions:**

- Reducing DWM fuel loads by selectively removing dead and fallen wood.
- Cut grass along perimeters of the summer village
- Monitor trees near powerlines for any tree leaning or uprooting
- Pruning and removal of dead lower branches on trees will reduce potential fire-starting point
- Monitor all activities on the environmental reserve. Activities that utilize machinery always have the potential to provide an ignition source for a fire.
- Restrict activity such as tree cutting during period of high or extreme fire danger.
- Consider putting water pumps into lake and have hoses ready during fire season
- Provide brochures and other educational materials related to forest fires. Educational material such as FireSmart for Homeowners <sup>3</sup>
- Consider the Firesmart Community Program <sup>4</sup>



Picture 8: Lightning scars are noticeable on several pine trees ( L ), remove very few dead trees and logs ( C ) continue with FireSmart activities to reduce risk of forest fires ( R )

## Pest Assessment

There are thousands of different insects, fungus, virus and bacteria's that are living in the forest that are just part of ecosystem and perform beneficial functions. Insects can act as pollinators, decomposers or as predators of pests. Examples of beneficial insects include ladybugs, ground beetles and parasitoid wasps.

There are a handful of insects and diseases that are consider pests and can endanger the overall health and vigor of the forest. Pests have the largest negative impact when a forest is in imbalance and trees are in a weakened state. Some insects can be destructive and are considered pests. Some pests cause only minor physical damage, while others limit growth or kill trees.

The most common insect defoliators that may occur in the Summer Village of Burnstick Lake forest are: Forest tent caterpillars, Bruce spanworm, Large Aspen Tortix, leaf beetles, yellow headed spruce sawfly and spruce budworm. Mountain Pine Beetle ( MPB) and Spruce beetle would most common wood borers. Mountain Pine Beetle has not been found but it is present in surrounding area.

There are very few trees with disease that has been found in the forest area are: Aspen trunk rot and mostly likely Armillaria root rot disease.

### **Mountain Pine Beetle (MPB) (*Dendroctonus ponderosae*)**

MPB is the most destructive insect of mature pine in western North America. MPB is a tiny black bark-boring beetle. The beetles favor Lodgepole Pine but they also attack Jack, Ponderosa and Scots pine. Beetles prefer to feed on older pine trees around 80 years of age with a 20 – 25 cm diameter, but during outbreaks they sometimes attack younger and smaller pine trees.

Amazingly it is not the beetle that kills the tree but in fact a blue stain fungus that they carry which infects the tree. This fungus begins to spread throughout the sapwood and restricts sap movement and eventually chokes and kills the pine. Larvae will also contribute to tree death since they girdle the tree by lateral feeding.

During the assessment MPB have been not found. MPB is widely spread in the area and it is most likely that most, if not all pine trees may be infested by MPB in the near future. Future actions must include removal of all pine trees and reforestation/tree transplanting of young pine seedlings from forest within Summer Village of Burnstick Lake.

### **Pest recommendations/suggestions:**

Overall, all there is very little that can be done to control large insect and disease outbreaks except monitoring and removal of dead and dying trees. Keeping beneficial insects and protecting their habitat is key for long-term pest management. Monitoring and surveillance during growing season will provide Summer Village of Burnstick Lake crucial information on health and vigor of their forest.

- Diversify forest age structure, which can increase the number of beneficial insects, bacteria and viruses
- Learn to identify and recognize common pests and their activities in your area.

- Monitoring is key for pest management. Routinely monitor the incidence of insects and diseases in the forest as well as on adjacent forested land.
- Keep written records of insects and disease and their outbreaks.
- Ask for advice and guidance from qualified pest control practitioners.
- Involve/inform neighboring forest property managers of pest management activities.

## APPENDIX 1. TREE & SHRUB INFORMATION

### **Lodgepole Pine**

Lodgepole pine is found on a wide range of soil types and moisture conditions but grows best on well drained loams. It is drought tolerant but does not prefer salinity or calcium-rich soils. Lodgepole pine is a 'fire species'. Following fires that do not destroy the cones, massive seed releases result in dense stands of young trees. Lodgepole pine has deep root system depending primarily on soil type. It is very rarely to see lodgepole pine trees uprooted unless roots are infected by fungus or damaged by humans.

Western Gall Rust is common disease. MPB is the most destructive insect to pine trees.

### **White Spruce**

White spruce grows very well on well drained, moist, loam, silty loam and clay soils but it can occur on many different types of soils across Alberta landscape. It grows poorly in sandy soils, in sites with a high water-table. White Spruce can tolerate some flooding during growing season. White spruce doesn't tolerate saline soil type.

Young seedlings will tolerate acid soils up to pH 4.5. On shallow soils the root system grows fairly flat and shallow while on deep soil will form a "heart" like root system. Because of shallow roots, a white spruce is very susceptible to being blown over, especially on thin or wet soils. Areas of blown down spruce can be prime breeding sites for the spruce beetle, which can then spread to mature trees and kill the trees. Blown down trees will also increase fire risk in your property.

White spruce grows best in full sunlight but can tolerate shade. In mixedwood aspen/white spruce forest, a young white spruce tree tolerates shade and grows under the protection of other species canopy until the top of white spruce reaches first branch of aspen. After that, it is time for aspen removal and white spruce will grow faster. In mixedwood coniferous stand, white spruce will often become the dominant tree species as stand ages.

White spruce produces thousands of seeds about every four years but doesn't follow any set cycle. In natural stands, cone production occurs primarily on dominant and co-dominant trees. Seeds will remain viable for only 1-2 years. Under natural conditions, seeds overwinter under snow and germinate in the spring or summer when there is adequate moisture and soil temperatures have risen. Seedling establishment is best on mineral soil but rarely on deep organic layers. Seedlings grow best in full sunlight, but can tolerate low light and shade. For a successful natural regeneration there must be nearby seed sources because the seed supply is greatest nearer the seed tree.

### **Aspen**

Aspen grows in almost every soil type but grows best in well drained, sandy or loamy soils with good moisture regime. It will not tolerate shade, or soils which are saturated for a long period of time. Aspen is very often the pioneer species and is usually the first tree species in an unoccupied area. Aspen also acts

as a “**nurse trees**” to softwood trees, mainly white spruce. The older aspen will provide a beneficial shade for these trees, which are tolerant to a shade.

Although, aspen produces tremendous numbers of seeds, it regenerates primarily by producing the new shoots from the root system of the parent tree. The new shoots are called root suckers and this process is called "suckering." Suckering usually occurs after a fire, harvesting and other disturbances. By removing the overstory canopy as much as possible, there is more heat and light available to the forest floor, which will stimulate suckering. In most cases aspen regenerates by suckering but some still comes from seedlings. Good seed crops are produced every 4 or 5 years and some open-grown clones may produce seeds annually.

### **Balsam Poplar (Black poplar)**

Balsam poplar is an important riparian species, which stabilizes riverbanks and maintains river islands. Balsam poplar flower production begins at about 8 years of age, with a good seed crop produced every year. Most seeds are wind dispersed and fall within 650 feet (200 m) of the parent tree. Vegetative reproduction: Balsam poplar is capable of regenerating from root suckers, stump sprouts; stem sprouts and buried branches. Root suckering is thought to be primarily a means of expansion rather than a means of recovery following clearcutting or fire.

Mechanical logging places balsam poplar at a competitive advantage over spruce by creating microsites for seedling establishment. Cutting mature balsam poplars results in sprouting from callus tissue and dormant buds. Balsam poplar is considered one of the tree species best adapted to fire in the northern boreal forest. Its ability to produce sprouts from roots, stumps and buried branches enables it to quickly recover after fire.

Moose commonly browses balsam poplar. Snowshoe hares utilize balsam poplar in times of food shortage. Snowshoe hares ignore first year growth of juvenile balsam poplars but ring the bark of mature trees and eat the twigs when within reach.

### **Plants as Indicators of Site Qualities**

When the preferred habitat of some of these plants is considered, and how extensively they occupy a site, they can give indications of growing site qualities. These qualities are generally the amount of moisture and nutrients that are available for plant growth. They can also be used as an indicator of qualities such as soil temperatures, water permeability of soils, soil alkalinity or acidity and recent ground disturbances.

When extensive coverage of these plants occurs, this is an indication of uniform qualities of moisture and or nutrients suitable for that particular plant. Plants that are good site quality indicators include dogwood, hazelnut, river alder, marsh reed grass, Labrador tea and bishop's cap.

- **Dogwood** - imperfectly to poorly drained, medium nutrient sites, tolerates fluctuating water table
- **Hazelnut** - well drained, calcium and nitrogen rich soils
- **River alder** - indicates imperfectly to poorly drained soils where spring flooding occurs, tolerates a variety of soil types, nitrogen fixer

- **Marsh reed grass** - prefers moist to wet, fine textured soils with pH between 5 and 5.9, medium nutrient regime, indicates good spruce growing sites if not too wet, may compete with young tree seedlings.
- **Labrador tea** - indicates moist to wet moisture regimes on acidic nutrient poor soils, inhibits growth of some other plant species
- **Bishop's cap** - prefers medium to rich soils with fresh to moist moisture regimes

Dogwood, Alder and Labrador tea and other plant species commonly found throughout the Summer Village indicate average to above average growing site qualities. Average to good tree growth rates shown from limited tree core samples confirm this. There was insufficient information collected to accurately establish the number and location of different quality growth sites.

## Biodiversity

Biodiversity is the measure of the number of species within an area, the genetic variations within those species, and the degree of interactions that occur between them. The degree of biodiversity in an area largely depends on the opportunity presented by the vegetation growing there. Diverse plant age structures and high numbers of different plant species will encourage more animal species to use the area.

Wildlife abundance and use of an area are good indicators of a healthy forest ecosystem. They are a significant part of a forest lifecycle that involves water, soils, plant-life, insects, birds and other animals of all sizes. Biodiversity conservation of native species is increasingly being viewed as being an integral component of successfully applying the sustainable land management concept.

Biodiversity includes several components:

- Genetic diversity –variety of genes within a given species
- Species diversity –variety of species within an ecosystem
- Landscape diversity-variety of ecosystems within a landscape

The conservation of all of these types of diversity needs to be considered in the area. Species diversity includes a variety of plants, birds, mammals and other components of forest ecosystems such as insects, fungi, bacteria and etc. Forest biodiversity changes through time. Areas with even aged plant structures and low numbers of different plant species will be used by fewer animal species. Old growth mixedwood forest has the highest number of different species. Riparian wetland areas also have a high number of different species

## Forest Succession

Forest succession is the process that forest plant communities go through when changing from one plant community into another. This can happen gradually, as with stand breakup, or quickly from disturbances such as fire, flood or harvest activities. Succession can begin with bare ground, after a fire, logging or other such event. Pioneer plants such as herbs, grasses or moss are often the first plants to grow. These

often have a short life span, and return nutrients and organic matter to the soil when they die. Plants such as willows, alders, hazelnut and water birch may appear next. This intermediate stage is the shrub stage.

Pioneer tree species are usually next to become established. These species are fast growing, shade intolerant trees like aspen, birch and jack and lodgepole pine, which may grow from seed or from root or stem suckers. Pioneer trees dominate the stand for the next few decades, as the trees grow, mature and reach old age. Because these trees are shade intolerant, very few seedlings grow in the understory. However, young shade tolerant trees, like white spruce and balsam fir, may be found.

As the pioneer trees grow old and begin to die, the shade tolerant trees start to take over the stand. With few seedlings, the numbers of pioneer trees drop and the stand becomes dominated by the shade tolerant species. Eventually, a single or group of species becomes established, forming a climax forest. Although individual trees in the climax forest die, seedlings developing in the understory replace them.



## APPENDIX 2.RESOURCES

- [Stepping Back from Water Guide](#)
- [Values of Urban forest- Tree Canada Foundation](#)
- [Tree insect and Disease for agroforestry](#)
- [Trees, insects and diseases of Canada's forests](#)
- [How to Plant Tree – Arbor Day](#)
- [Mulching Trees and Shrubs – Yard Whispers](#)

### Woodlot Management Guide for Alberta

[https://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/apa15536/\\$file/woodlot-book%20rd.pdf?OpenElement](https://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/apa15536/$file/woodlot-book%20rd.pdf?OpenElement)

### University of Lethbridge Spatial Data Library

<https://digitallibrary.uleth.ca/digital/collection/geo/id/496/rec/8>

### The system of soil classification for Alberta. On-line Soil Viewer

<https://soil.agric.gov.ab.ca/agrasidviewer/>

### Soils of Canada

<https://soilsofcanada.ca/orders/chernozemic-soils.php>

### Natural Ecoregions of Alberta

<https://open.alberta.ca/dataset/abc81bdb-8b2a-4b81-bb21-61caeda0a029/resource/3a33b989-fca4-45f7-a231-bfd95c6f0166/download/depv1a.pdf>

### Alberta Water Act Legislation

<https://www.alberta.ca/water-legislation-and-guidelines.aspx>

### <sup>1</sup> Stepping Back from Water Guide

<https://open.alberta.ca/dataset/1c70eb43-a211-4e9c-82c3-9ffd07f64932/resource/6e524f7c-0c19-4253-a0f6-62a0e2166b04/download/2012-SteppingBackFromWater-Guide-2012.pdf>

### <sup>2</sup> Alberta Invasive Plant Identification Guide

<https://open.alberta.ca/dataset/8bb61884-bbfb-4640-bd5d-96f6e633d4ee/resource/275f7dbe-8116-4d81-ba95-329df950be7e/download/6740590-2013-alberta-invasive-plant-identification-guide-2013-06-13.pdf>

### <sup>3</sup> FireSmart for Homeowners Manual

[https://firesmartcanada.ca/wp-content/uploads/2019/10/FS\\_Generic-HomeOwnersManual\\_Booklet-November-2018-Web.pdf](https://firesmartcanada.ca/wp-content/uploads/2019/10/FS_Generic-HomeOwnersManual_Booklet-November-2018-Web.pdf)

<sup>4</sup> FireSmart Community Program <https://firesmartcanada.ca/programs-and-education/community-recognition-program/become-a-firesmart-community/>

## APPENDIX 3. REFERENCES

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## APPENDIX 4. GLOSSARY OF TERMS

**Access** - Means of gaining entry to a tract of timber/forest

**Age** - Age of the trees comprising a forest, crop, or stand. In forests, the mean age of dominant (and sometimes co-dominant) trees is taken. The plantation age is generally taken from the year the plantation was begun, without adding the age of the nursery stock.

**Age Class** - A distinct group of trees or portion of growing stock recognized on the basis of age.

**Biodiversity (biological diversity)** - Refers to the variety of life on three different levels: the variety of ecosystems (ecosystem diversity), the variety of species (species diversity) and the variety within species (genetic diversity).

**Canopy** - The more-or-less continuous cover of branches and foliage formed by the crown of adjacent trees.

**Clearcutting** - A forest management method that involves the complete felling and removal of a stand of trees. Clearcutting may be done in blocks, strips or patches.

**Decadent** - a silviculturist term for older trees that are on the verge of dying. Decadent trees are often riddled with deadwood, fungal infections and other structural deficiencies.

**Defoliation** - The loss of leaves or needles on a plant or tree.

**Defoliator** - An insect or other agent that consumes foliage.

**Diameter at Breast Height (DBH)** - The stem diameter of a tree measured at breast height above ground level, or 1.3 m

**Early Forest Succession** - The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned.

**Even-aged Forest** - A forest stand or type in which relatively small age differences (10-20 years) exist between individual trees.

**Forbs** - Broad-leaved, non-woody plants that die back to ground level after each growing season (perennial). Ferns and fern allies are considered forbs.

**Forest Management Plan (FMP)** - A plan prepared for a forest management unit that describes how the timber or other resources will be managed.

**Forest Type** - A group of forest areas or stands whose similar composition (i.e., species, age, height and density) differentiates it from other such groups.

**Fragmentation** - The splitting or isolating of patches of similar habitat, typically forest or prairie plant communities, but including other types of habitat. Habitat can be fragmented naturally or from land management activities, such as clear-cut logging or cultivation

**Ground Cover** - A ground cover is any low-growing plant that shades an area in the landscape

**Habitat** - The area that provides an organism with adequate food, water, shelter, and living space, and/or the conditions of that environment including the soil, vegetation, water, and food.

**Hardwood(s)** - Trees that lose their leaves in autumn, also refers to the wood produced by these trees. Hardwoods belong to the botanical group angiospermae and are the dominant type of tree in deciduous forests.

**Mature/overmature Stands** - Stands that have reached rotation age or have a reduced growth rate due to advanced age. Such stands normally have large mature or overmature trees, an abundance of large live trees with heart rot, numerous snags, stubs and high stumps and an abundance of large downed woody debris.

**Natural Regeneration** - Renewal of a tree crop by natural seeding, sprouting, suckering or layering.

**Old Growth** - A forest of mature or overmature timber that is beyond its peak growing period.

**Overmature** - Trees or stands past the mature stage, where growth rates or value are declining.

**Pest** - An organism capable of causing material damage. Forest pests include insects, tree diseases and noxious fungi.

**Reforestation** - The reestablishment of trees on denuded forestland by natural or artificial means, such as planting and seeding.

**Regeneration** - The continuous renewal of forests. Natural regeneration occurs gradually with seeds from adjacent stands or with seeds brought in by wind, birds or animals. Artificial regeneration involves direct seeding or planting.

**Selective Cutting** - Annual or periodic cutting of trees in a stand in which the trees vary markedly in age. The objective is to recover the yield and maintain an uneven-aged stand structure, while creating the conditions necessary for tree growth and seedling establishment

**Silvicultural Systems** - Systems that follow accepted silvicultural principles, whereby the tree crops are tended, harvested and replaced to produce a crop of a desired form. This includes even-aged (i.e., clearcutting, shelterwood or seed tree cutting) or uneven-aged (i.e., selection cutting) systems.

**Snag Tree** - A dead standing tree at least 6m in height that may provide roosting or cavity nesting/denning opportunities for wildlife

**Stand** - A community of trees sufficiently uniform in species, age, arrangement or condition so as to be distinguishable as a group in the forest or other growth in the area.

**Stand Density** - A quantitative measurement of a forest stand often expressed as number of stems, volume or basal area per unit area.

**Succession** - The replacement of one plant community by another in progressive development toward climax vegetation.

**Sucker** - A sprout from the lower portion of a stem, especially from the root.

**Understory** - The trees and other vegetative species growing under the canopies of larger adjacent trees and other woody growth.

**Uneven-aged** - The term uneven-aged is used to describe stand of trees in which ages of the trees generally differ by more than 20 years. These forest stands are made up of tree species which have evolved a regeneration pattern which is tolerant of lower light conditions and competition from other species.

**Watershed** - An area of land that is drained by underground or surface streams into another stream or waterway.

**Wildlife Habitat Diversity** - The distribution and abundance of different plant and animal communities and species within a specific area.

**Xeric moisture regime** - A xeric habitat is characterized by soils that are well to rapidly drained and low or deficient in moisture that is available for the support