WILDFIRE RISK REDUCTION

IN THE NORTH OKANAGAN

CITY OF Vernon

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WILDFIRE RISK REDUCTION

FOR PRIVATE LANDOWNERS IN THE NORTH OKANAGAN FORESTS

PURPOSE OF THIS GUIDE: A Note from the City of Vernon

As the climate continues to warm over the next several decades, drought will become a significant issue in the North Okanagan and our wildfire risk will continue to increase. As a resident of British Columbia, you may have received a FireSmart brochure from the Province of B.C. or possibly even attended a FireSmart workshop. This guide is a companion to the FireSmart principles and is intended for owners of larger properties (greater than 1 acre) who may be interested in the long-term planning of wildfire risk reduction and forest restoration.

The first step to reducing exposure to harm from increasingly severe wildfires and other natural events is to become informed. This guide provides science-based, relevant, and geographic-based information to help North Okanagan property owners better understand the risks of life lived in a dynamic, fire-prone landscape. Inside, you will find information that can help empower you to reduce vulnerabilities around your home, while also creating an environment in which Fire Services can safely and effectively respond to a wildfire on your property.

This guide discusses the meaning and benefits of reducing vulnerability to wildfire, and provides recommendations to help you with the process of creating a safer, more fire-ready landscape. By reading this guide, you'll learn how forest restoration works, the steps involved, and some of the ways you can help protect yourself, your watershed, and your community by taking practical and proactive steps with the support of experts in the field of forest management and fire risk mitigation.

The City of Vernon and Vernon Fire Rescue Services are taking specific steps to identify and manage wildfire vulnerabilities and risks throughout the community and are working closely with a number of stakeholders and partners to make Vernon more resilient to this naturally-occurring process. But we can't do this alone.

As a local property owner, we thank you for taking the time to read this guide and consider the steps you can take to help protect yourself, your property, your neighbours, our emergency responders, and our community from the impacts of wildfire.

David Lind,

Fire Chief, City of Vernon

PART I

A HEALTHY FOREST IS FIRE-READY.

Fire is a natural and beneficial part of a healthy ecosystem in our region. The health of our communities is bound to the health of this fire-prone landscape we call home. But the increasingly catastrophic nature of today's wildfires, driven by warmer temperatures, drought, and overgrown, degraded forest lands, threaten our clean air and drinking water, fish and wildlife habitat, and the safety of our communities.

Private landowners like you play an important role in maintaining forest health in our region. The practice of Restoration Forestry recreates conditions where forests are better able to coexist and survive natural hazards like wildfires, along with insect outbreaks and disease.

Actively managed forests are healthy forests. They have a much higher likelihood of surviving somewhat intact and functional after experiencing wildfire or any of the other natural hazards that are growing more common and severe. Actively managed forests can bounce back.

LIVING IN THE FOREST

Many residents who choose to call Vernon home have decided to live outside the urban area, and instead, dwell on small-acreages in the southwest part of the municipality. Currently, there are approximately 226 private landowners, like yourself, living along Eastside Road, Tronson Road, and in the Village of Predator Ridge.

For thousands of years prior to our arrival, many occupants and processes were shaping the forests we treasure and are proud to call home today. We have chosen to live here for many reasons, including the quiet and natural landscape and the chance to appreciate all that nature has to offer.

However, as residents of this wildland area, we also know there are risks in the North Okanagan, including the potential for floods, insect outbreaks, and wildfires. Called *natural hazards*, these processes have always been components of healthy and predictable ecosystem cycles that don't account for human lives, property, preferences, or needs.

THE STATE OF OUR FORESTS

Historically, human occupation of the forest has been constant. We've used forests for everything from subsistence hunting and gathering and early settlement to mining, transportation, recreation, wood products, wildlife habitat, drinking water, and aesthetic values.

In the backdrop of all of these uses is the presence and process of wildfire. Okanagan forests are 'fire-dependent'. For thousands of years, fires have shaped the ecosystems not only of our province but most of the Canadian west. Fire's footprints on the land are as different as the thousands of plants and animals that make up our natural world. Every species and habitat developed its own relationship with and response to these fire cycles, and many depend on its rhythmic return for survival.

The hotter-drier climate, combined with our successful efforts to stop over 90% of wildfires has upended these historic, beneficial fire relationships. Lack of fire means that most of our Okanagan forests are now old, weak, and overcrowded. This crowding contributes to the wildfires we're faced with today. Forests' ability to rebound from wildfire and provide us with clean air and water is waning. Restoration Forestry helps to bring forests back to a state of equilibrium, returning them to the resilient state that allowed them to endure for millenia.

WHAT IS A HEALTHY FOREST?

Your forest is far more than a collection of trees. Forests are complex communities not unlike our human neighbourhoods which require routine maintenance, neighbours of several generations, and systems in place that support livability.

Imagine that all the services, amenities, and resources you and your neighbours rely on have disappeared. No trash removal, public safety response, clean water, power, medical services, grocery stores, gas stations, or property and road maintenance. Most of the generations in your community have disappeared, with only toddlers and the elderly remaining. Competition for survival would be intense. Weakened by stress, without the presence of diverse, physically strong, productive contributors, little food or clean water, and no ability to reproduce, your community would be unsustainable.

Welcome to the Okanagan's 21st Century, unhealthy forests. A buildup of waste, along with intense competition for essential resources like water, nutrients and light, has left forests vulnerable to insect and disease attack, wildfire, and other types of damage at enormous scales.

Overgrown, crowded forest.

Healthy, restored Okanagan forest, multi-age stand with sun and shade and space.

WHY YOU SHOULD GET INVOLVED:

THE BENEFITS OF FOREST RESTORATION FOR THE PRIVATE LANDOWNER

As a private forest owner, this is where you come into the story. You may be a full-time resident or only here seasonally. Your property might be occupied or vacant. You may manage your forest for income, long-term investment, wildlife, recreation, aesthetics, all of the above, or none of the above.

Regardless of your unique situation, your 21st Century forest is challenged, changing, and at risk, as are the communities and landscapes to which it is inextricably connected.

Restoring your forest benefits you by proactively managing risk of:

- Loss of property value, soil, wildlife habitat, and way of life
- Damage to or loss of viable, clean water sources
- The expense of post-fire rehabilitation, erosion control, repairs and rebuilding.
- Post-fire bark beetle infestation

Private forest restoration also helps reduce risk of community loss such as:

- Damaged public infrastructure
- Firefighter injury or death due to excessively dangerous conditions

We stand at a crossroads. We can amplify the vulnerabilities of our current and predicted forest conditions through inaction, or take proactive, protective measures together to shore up the strengths inherent in healthy forest systems.

Forest restoration efforts reduce our vulnerability. It supports harmony within the natural characteristics of the landscape, maintains viable natural resources for future generations, and protects you and your community.

PART II

UNDERSTANDING OUR LANDSCAPES: THE ECOLOGY OF NORTH OKANAGAN FORESTS

FOREST TYPES

LOW ELEVATION

We have a family of distinct forest types here in the North Okanagan. Like any typical family, each member has its own strengths, weaknesses, requirements and preferences. Some are picky. Others are more flexible and dynamic. A few play well with others, while others do not. They each have their own requirements for altitude and aspect, and for how and when and they get their sunlight, water, and fire.

PONDEROSA PINE

Ponderosa pine forests occupy the zone of vegetation between grasslands (below them in elevation) and mixed conifer forests (above them). The iconic trees with their thick planks of bark are one of our most abundant lower timberline species. They thrive on warmer, drier, south-facing mountainsides and slopes. Healthy ponderosa landscapes are wide open with lots of space, sunlight, and little competition from other plants and tree species. Ages range from saplings to towering, mature adults. Ponderosa provides wood products, critical habitat for wildlife while alive or dead, outstanding recreational terrain, and support for our water supply.

Ponderosa is programmed to partner with fire, requiring relatively frequent, low-intensity fires that create sunlit, open conditions. Before Europeans settled our region, natural fires burned through ponderosa stands anywhere from every 2-35 years. Fires occurred frequently at lower elevations where warmth and dryness created ready-to-burn conditions. Above 1,000 meters, where ponderosa mingles with Douglas-fir and lodgepole, cooler, wetter conditions meant that several decades could pass between one fire and the next.

Unhealthy ponderosa stand.

Low intensity surface fire moving past trunks of ponderosa.

Healthy ponderosa trees have many unique ways of not only surviving fires but using them to their advantage. Once they've grown to a diameter of about 10 cm, their bark is thick enough to protect them from fire's heat. The low, slow flames they've historically relied on move through the forest without inflicting injury, clearing invading seedlings and saplings. Ponderosa can also jettison their bark if a fire grows hot enough to ignite it. Under some conditions, ponderosa will shed their low branches as they dry out and die. This creates a fuel-free zone between surface flames and healthy branches above, preventing fire from using the dead wood as a ladder into the tree crowns. In yet another fire survival function, the flexible branches and long needles of ponderosa wave back and forth while flames do their work along the ground. This action mixes the air and dissipates heat, reducing the potential for scorching - not unlike how we open our mouths and shake our hand in front of it when our soup is too hot. As the trees mature they develop deep tap roots that surface fires can't damage while providing water during drought.

In contrast, the ponderosa forests of today, missing their fiery partner for over a century, have grown unnaturally crowded, shady, and stressed. They're vulnerable to destruction by fire rather than being enhanced by it. An overgrown stand means a shady, cooler forest floor better suited for shade-tolerant Douglas-fir which will out-compete young ponderosa. When fire comes, Douglas-fir provides the ladders to the treetops that ponderosa evolved to eliminate with their limb-shedding trick. Flames then have a free and easy climb to the forest canopy where they can spread fast and hot. These "crown fires" can kill fire-resistant, seed-bearing adult trees. With no surviving seed source for regeneration, ponderosa forests are replaced by other tree species.

SPOTLIGHT: Forest restoration activities that incorporate prescribed fire help prevent loss of ponderosa by re-creating and protecting the sunny, open conditions they require while enhancing the resilience of our watershed.

MIXED-CONIFER

Mixed-conifer forests are next up in elevation where they're found in the zone above the ponderosa pine zone. The term "mixed-conifer" is precisely what you'd expect: A forest made up of several different conifer species (trees with cones), with deciduous species making an occasional appearance.

Very different from ponderosa forests dominated by a single species, mixed-conifer forests can be recognized by their jumble of varying tree types. Each species contributes its own structure and has different requirements for survival and reproduction. These forests can include Douglas-fir, ponderosa pine, subalpine fir, Engelmann spruce, western red cedar, and lodgepole pine. The blend varies depending on soil type, elevation, and the direction the forest faces. South facing forests are warmer and drier so ponderosa, aspen, Douglas-fir, and rocky mountain juniper can persist into higher elevations where they still have sufficient sunshine and warmth. North facing forests provide lots of shade and the cool, moist conditions preferred by Douglas-fir which often dominates mixed-conifer forests there. On these same mid-elevation, moist sites, heat-averse lodgepole and subalpine fir enter the mix.

Mixed-conifer forests are champions of watershed protection and are the backdrop for many of the Okanagan's iconic recreational and scenic lands (i.e., ski resorts). They're an essential wood source for products made by British Columbia businesses and provide shelter for many wildlife species, including breeding habitat for songbirds, elk and moose.

Historically, mixed-conifer forests relied on mixed fire intensity and timing. Low-intensity fires burning every 20 years or so refreshed the forest floor by clearing accumulations of shrubs and dead wood. These fires were punctuated by hotter, faster fires that burned in patchy patterns roughly every 75 to 100 years. They brought in sunlight by burning holes in the canopy and clearing the ground, allowing sections of the forest to start anew.

Today, many of the Okanagan's mixed-conifer forests are shrunken and segmented by development and overcrowding. Successful fire suppression means they're much thicker than they were under the fire patterns of the past, packed with too many trees and thickets of dead wood. This amplifies the impacts of threats like warmer temperatures, drought, insects, and disease. They're ripe for fires that, under the severe fire weather conditions we're seeing more frequently, can kill most or all of the trees across a landscape.

It's essential that we work to restore healthy conditions to mixed-conifer forests at every opportunity. Through thinning and restoring the variable fire cycles they require, we can help mixed-conifer survive and bounce back from wildfire, and strengthen their resilience in the face of climate change.

Stand-replacing burned watershed area.

Restored (thinned and rx burned) mixed conifer forest.

INSECTS AND DISEASE

Bugs and diseases are important players in the life processes of our forests. Most of those at work here are native to British Columbia. They've come and gone in natural cycles for tens of thousands of years, and along with fire, they're the primary forest change agents. They create healthy variation in forest structure, provide food and habitat for wildlife, and contribute recycling services. They can also stunt tree growth or kill trees by the dozens or millions, reduce timber productivity and create safety hazards. Big insect outbreaks cause fast, widespread changes. Diseases spread more gradually, but can also have broad impact. Insects and diseases often interact with each other. For example, root disease makes trees vulnerable to bark beetle attack.

Beetle-killed standing dead and downed logs.

Today's outbreaks are intensified by a combination of 21st Century conditions including rapid climate change. Forest conditions have made several tree species exceptionally vulnerable. Long, cold winters killed most beetle larvae, keeping populations in check. Recent warmer, shorter winters have allowed beetle larvae to survive and spread quickly in spring, taking advantage of already stressed forests.

The scope of tree mortality from insect outbreaks in British Columbia has generated unease over possible impacts on our water supply. Loss of trees can affect the retention of snowpack and time and pace of spring runoff. Research has shown however, that the effects on our water supply after wildfire are more concerning than those incurred after beetle infestation.

Close up of beetle pitch tubes.

Mistletoe-infected tree.

WILDLIFE

The North Okanagan region is a state of tremendous geographic diversity and home of some of Canada's most charismatic wildlife. From our high altitude parkland to our river canyons and desert sage lands, south-central British Columbia is home to thousands of species of mammals, fish, reptiles, amphibians, birds, butterflies and other wildlife, some found only in our area.

From the largest mammal to the smallest microscopic organism, wildlife are all environmental engineers in one way or another. Each species fulfills an essential role that contributes to ecological balance – predator, prey, seed spreader, shelter maker, soil shaper, pollinator, decomposer, water manager.

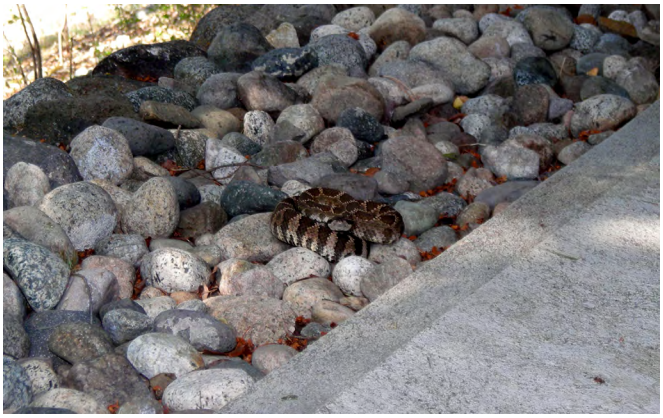
Predators keep populations of prey species in check. Carrion feeders accelerate decomposition and recycle animal remains. Several bird species fragment standing wood while feeding, speeding up the decay process. They also disperse seeds and influence forest regeneration. Rodents transport beneficial lichen and fungi. Browsing and grazing by ungulates shapes plant communities. Mammals dig burrows large and small that are subsequently used by amphibians and reptiles. Other mammals sculpt water sources by creating diversions or dams, or create ponds or wetlands through wallowing. These modifications then provide for a wide array of other wildlife species. Dozens of amphibian, reptile and bird species tunnel, dig and turn over soil helping to maintain and improve soil structure and aeration.

Humans are part of our forest ecosystems too, and we're environmental engineers of the highest order. Many species of wildlife are at risk because of our unique ability to engineer entire landscapes to suit our liking, nearly overnight.

The negative effects of our population growth and expanding ecological footprint is stressing many wildlife species just like it stresses the forests. Be it in the form of habitat loss, fragmentation, or degradation, introduction of diseases,

pollutants, invasive species, and climate change, we've reduced access to food, restricted movement and migration, increased dangerous contact with humans, domestic livestock and other wildlife.

All living things have always been subjected to countless evolutionary changes and pressures and have proven to be well adapted to respond with resilience. But the fast pace of environmental change we've created has never occurred before. The ability of wildlife to adapt and bounce back is outstripped more with each passing year, increasing concern for the well-being and survival of many species.



A species of endangered megafauna (western diamondback rattlesnake).

Snags (dead trees) are an important habitat value to maintain and protect on your acreage.

PART III

KNOW YOUR OWN LAND AND MAKE YOUR PLAN

Now that you have a fuller picture of our natural forest systems and your role in supporting them, put some thought into the questions below. The answers will give you a personal perspective on your relationship with your land.

- WHY DO I OWN THIS FOREST?
- WHAT BENEFITS AND CHALLENGES COME WITH OWNERSHIP OF THIS LAND?
- WHAT CAN MY FOREST SUPPORT NOW?
- HOW WILL THAT CHANGE IN OUR WARMER, DRIER FUTURE?
- WHAT ARE THE GREATEST REWARDS OF OWNING THIS FOREST AND ARE THEY WORTH PROTECTING AND SUSTAINING THROUGH THE COMING DECADES?

These questions may be weighty for many, but the answers hold the key to customizing your restoration process and investment. They provide the scaffolding for your goals, plan, and process, and arm you with the information you need to take your first step: finding a partner in a professional forester.

There's no reason to do this alone. Many of the most experienced and informed foresters in the province live right here in the southern interior of BC, and they specialize in helping landowners like you. It's their job to listen and use their experience to guide the process. When you find the right one you'll be a team, navigating the process together as you plan, set goals, and work to reach them.

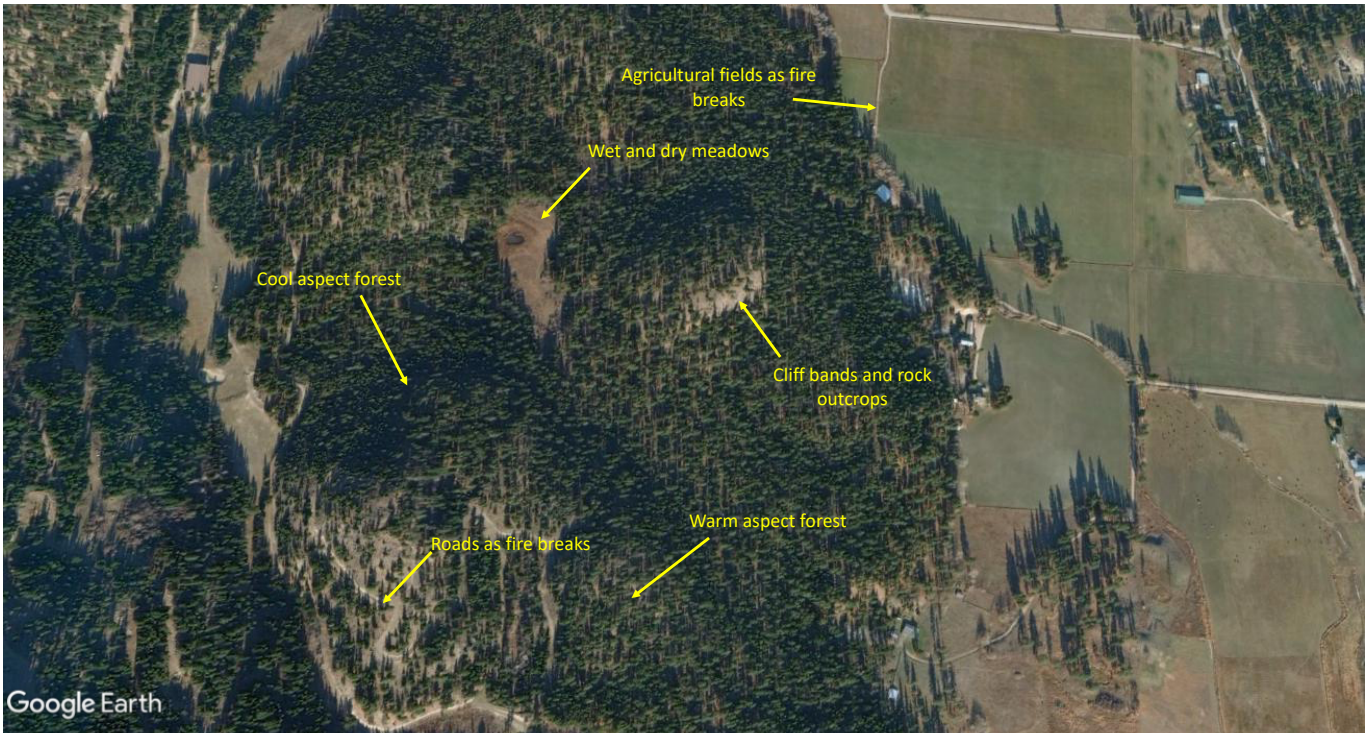
ASSESSING YOUR LAND

Like most things in life, you can't know where you're going unless you know where you're starting from. In forest restoration, you define your starting point by taking stock of what you have.

Like doctors with a patient, you'll work with your forester to perform a checkup of your property. You'll catalog the contents and conditions of your forest to create a detailed snapshot of the current situation. This eye-opening baseline survey will show you what's working and what's not. From there, you'll be able to create restoration goals that make the most of your assets and reduce your risks.

FOREST SURVEY ACTIVITIES INCLUDE:

- Identifying all the different tree species
- Performing a check up on the health of your trees by looking for evidence of insects and diseases like mountain pine beetle or mistletoe infestation
- Measuring and recording the diameter of your trees to determine their ages and vigor
- Discovering whether the density of your forest (the number of trees per hectare) poses a risk of loss from fire or insects
- Locating all streams, wetlands, ponds and seeps, both seasonal and perennial
- Identifying unique features of your forest such as views, history, rare wildlife or plants
- Making note of property boundaries, corrals, fences, structures, utilities, wells, adjacent roads, driveways, and other access points
- Noting the varying physical characteristics present across your property, like soil types, elevations, aspects, and temperatures
- Charting evidence of fire history
- Researching property history, past owners and land uses
- Identifying appropriate areas for the safe reintroduction of fire, along with built-in fuel breaks like water sources, rocky areas, and roads
- Identifying areas to leave untouched



Typical North Okanagan private forest.

To get the birds' eye view, you'll supplement this information with aerial images from Google Earth or other publicly available databases. This additional perspective will really give you a feel for the patterns in place on your property, allowing you to prioritize work on areas most at risk for severe fire and disease.

With this comprehensive knowledge of the state of your forest in hand, you'll have what it takes to craft your Restoration and Management Plan. The plan is your route from here to your forest's resilient future, complete with compass, waypoints, schedule, destination, and budget.

DEVELOPING YOUR RESTORATION PLAN

The thought of creating a management plan can muster mental pictures of people in business suits hunched around a conference table in a far away office tower. Intimidating. Overwhelming. Not your thing.

But you can breathe easy. Your management planning experience won't be anything close to that. It's an adventure of sorts, involving discovery, empowerment, and inspiration. You'll learn all about your property and unearth possibilities for proactively protecting your land and your legacy.

Whether you're just starting out as a forest owner or you're a lifelong active forest manager, it's never too late, or too soon, to create a plan. It doesn't have to be perfect or cover all possibilities in perpetuity. Good plans are living documents that change and adapt with time. As you learn more and gain experience you can mold your management plan to fit your expanding perspective.

At its core, a forest management plan describes your land, what it means to you, what you want to do with it, along with how and when you'll carry out your plans for it. It's about much more than the trees. The plan will cover all the resources on your land including water, wildlife habitat, recreation sites, roads and trails, wildfire protection, and pest management. It includes anything and everything that's relevant to your goals.

As you develop your goals, you'll consider all that you have, and all that you don't. You likely have limited time and money. Your property might present some extra challenges like steep terrain, rocky soil, or extensive disease or insect problems. These conditions can potentially narrow your options, but being fully aware of them up front will help you create realistic goals and objectives that set you up for success.

You can write your plan yourself or work on it with the help of your professional forester. Many online tools and guides are available that make it easier than ever to collect maps and other information you need.

Once you finish your plan, remember that it's flexible and adaptable. Refer to it and update it frequently, as forest management is a long-term process. Values will change in unpredictable ways over the coming decades. Over generations, your family's purposes for owning your property may evolve. The plan will help you make decisions and plan for tomorrow.

*It is **never too late** to get started.*

WHAT DOES RESTORATION LOOK LIKE ON PRIVATE LAND?

LOWER YOUR FIRE RISK - THIN TO WIN

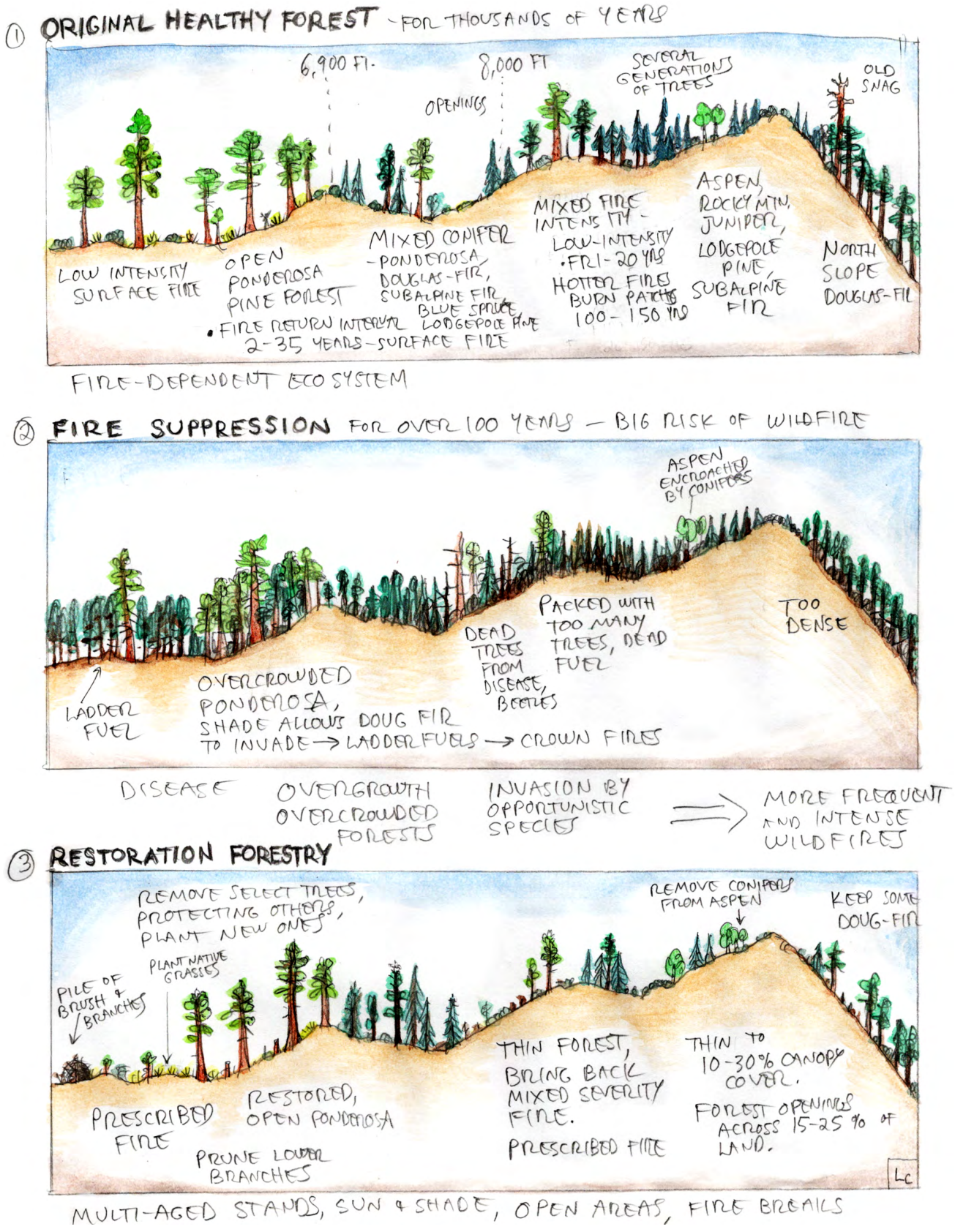
Reducing stand density is a core component of forest restoration in the southern Interior of BC, and reduction of hazardous fuels is a natural byproduct of the process. Selectively thinning out overly dense stands, preserving old trees, getting rid of overgrown vegetation on the forest floor, pruning lower branches, and creating permanent fire breaks give your forest a better chance of bouncing back after a wildfire.

Specific restoration recommendations include:

- Sufficient thinning to create a patch work of forest openings of different sizes across a large proportion of your forest
- Reducing the volume of trees so that canopy cover is greatly reduced, along with the removal of Douglas-fir trees (except on north aspects)
- Keeping and protecting old growth trees

Because many of the risky conditions you'll be working to fix were created by fire's absence, prescribed fire is the crown jewel of restoration tools for fire-reliant forests. It helps you reach your restoration goals faster and more efficiently while bringing benefits that only fire can bestow. Wildfires that burn into areas where prescribed burning has occurred cause less damage and are much easier to control.

NORTHERN OKANAGAN FORESTS



Progression of North Okanagan forest conditions over the last 150 years. Illustration - Laura Cunningham

FOREST THINNING METHODS AND TOOLS

The work can be accomplished with the help of contractors who'll use a variety of methods and tools that might include axes, chainsaws, heavy equipment, targeted grazing, prescribed fire, or all of the above.

HANDWORK: LOP AND SCATTER

Hand tools like pruning saws and loppers can be used to remove the lower branches of trees. The resulting slash can be piled to serve as shelter for wildlife, or burned in winter when the risk of fire spread is very low. It can also be cut into small lengths and spread across the ground.

MACHINERY LARGE AND SMALL: MOWERS, CHIPPERS, MASTICATORS, AND FELLER-BUNCHERS

Smaller trees can be felled by hand or by mowers, and processed into small pieces using chippers or masticators, which grind trees down and spread the chipped wood across the forest floor.

Harvesting large trees involves removal of limbs and tops and slicing them into merchantable sizes. For the sake of efficiency, this is generally done mechanically, either on site in the forest or at a prepared landing site. A machine called a feller-buncher uses hydraulic clamps to steady a tree as it's being cut. Some models can cut and collect several trees together and drop them into one bunch. These machines can be attached to an articulating arm or boom, or directly onto a tractor or other vehicle. This allows the clamps to reach out and into stands to collect trees which reduces the travel required to cover the site.

Hog fuel grinder

PILING

During visits to our Crown forests, you may have seen cone-shaped piles of brush and branches scattered throughout areas that have been thinned. This method allows the thinning process to be completed in two stages: cutting and piling, then removal or burning when there is snow on the ground. This is a common and efficient method for achieving restoration and reducing fire risk.

Pile burning.

Sloop burning.

PRESCRIBED FIRE

The frequent fire that the North Okanagan forests and grasslands evolved with was the result of lightning and First Nations peoples. In fact, the vast majority of historical fires were ignited so that Indigenous peoples could produce ample supplies of nutritious foods and medicines, hunt wildlife, create travel corridors, communicate over long distances, sanitize the forest against insects

and diseases, and generate tools and firewood. The Syilx People of the Okanagan Nation had a highly sophisticated understanding of how fire interacted with the regional ecosystems and how best to use fire to ensure their survival. They were the first prescribed burners. The contemporary application of prescribed fire is performed by a team of fire experts only during very specific weather conditions that help restore health to fire-dependent ecosystems, and the most practical and cost-effective way to reduce dangerous accumulations of combustible fuels.

Prescribed fire brings many unique benefits including:

- Lessening the risk of damage from severe wildfire
- Kickstarting new growth of native vegetation
- Maintaining conditions that the many fire-dependent plant and animal species require in order to thrive.

your land by strategically removing select trees, protecting and enhancing the health of others, and planting new ones.

For example drought- and fire-tolerant ponderosa pine is commonly preferred for retention over Douglas-fir because it's better suited to withstand our hotter drier future. However, if you have some healthy, mature Douglas-fir trees it means there continues to be enough moisture and shade on their site to support longevity. You might choose to hang on to some of them to diversify tree ages and species.

If aspen is present on your property your goals will likely include removing encroaching conifers and installing barriers that deter deer or elk browsing. This will help them regenerate. If you have Rocky Mountain juniper growing beneath ponderosa pines where it would function as a ladder for fire to climb, you'll likely plan to remove it. But if your juniper is growing free and clear of other

Prescribed fire operation.

Aspen with conifer encroachment.

INCREASING COMMUNITY AND FIREFIGHTER SAFETY DURING WILDFIRE SEASON

Multiple thinning processes are often mixed and matched to prepare the land for the safe reintroduction of fire. Mastication and mowing are often used to prepare sites for prescribed fire as they get rid of ladder fuels that might enable fire spread.

MIX IT UP - AGES, SPACES, AND SPECIES

Healthy Okanagan forests contain multiple tree species represented by several generations, arranged in a mix of groups, single isolated trees, and clearings. You can restore these conditions on

Highly hazardous juniper/Douglas-fir stand.

tree species, you might thin denser stands but keep some around. Juniper provides food and shelter for a number of wildlife species like deer, migratory birds, and upland game birds. It also helps to stabilize the dry, alkaline soil it prefers.

Managing the right mix of understory species is also important. By understory species, we mean grasses, herbs, and shrubs. As much as possible, we want to maintain and encourage healthy populations of native plant species. Some introduced species - such as cheatgrass - can significantly increase wildfire risk and, through an increase in fire activity it's known to force native species out. Even within the scope of native plants, some are more desirable than others.

Appendix II lists the preferred and non-preferred plant species for your Okanagan property.

Pre-treatment.

Post-treatment.

Multi-age stand.

Healthy mixed-conifer / multi-species forest.

MAKE WAY FOR WILDLIFE - BIRDS, BATS, BADGERS AND BOBCATS

Everybody needs food, clean water, shelter, and a safe place to raise a family. A component of every solid restoration plan is the provision of support for as many different species of wildlife as you can. Overgrown, stressed forests don't provide the conditions that many wildlife species need. Sixty to ninety percent of at-risk wildlife rely on private forests for essential habitat.

Optimizing wildlife habitat is one of the simplest and most rewarding endeavors of forest restoration. The features that wildlife requires might already be present on your land, and may just need to be revealed, protected or enhanced. Old snags and partially dead trees provide nest sites and food for cavity nesting birds, along with flying insects for bug-eating bats. Big stumps and scattered logs provide much-needed habitat and refuge for birds, small animals, reptiles and invertebrates. These old wood structures nourish the soil as

Healthy ponderosa dominated forest.

Prescribed fire in the Okanagan.

they decompose. Wildlife will also make use of any hardwood trees and fruiting shrubs you may have. If you don't have these on your property, consider planting some to provide additional food and shelter, and to boost the diversity of tree species.

Plan to provide easy, safe wildlife access to water. You can create wildlife water sources like guzzlers or cisterns. You can also develop your forest springs or build wildlife ramps.

Consider excluding livestock from sections of creeks or ponds to preserve water quality native vegetation that fortifies stream banks and wetlands. Plant wildlife-friendly seed mixes along dirt roads, paths, parking zones, and other areas regularly trafficked by wheels, hooves or feet. Wildlife require safe corridors for seasonal migration and will continue to use areas based on their historical movement patterns. Consider leaving open spaces that contain native grasses unmowed, and allow wildlife to continue moving through the area. Where fencing is required, solid rail fences provide highly visible boundaries that are easy for wildlife to navigate.

BATTLE BEETLES AND DETER DISEASE

Understanding the role that forest insects and diseases play in the ecology of our forests is critical to achieving forest restoration success. Managing them involves - to the degree possible - altering the conditions that have supported the situation. Thinning conifer stands and removing infested trees are givens and may reduce bark beetle impact. Removing mistletoe-infected overstory can help protect subsequent generations of trees from future disease.

Optimizing wildlife habitat is one of the simplest, most rewarding endeavors of forest restoration. Illustration - Miriam Morrill

FOREST SURVEY ACTIVITIES INCLUDE:

- **Removing all infested trees and material** created by thinning or pruning. Ongoing removal of trees already affected by insects or diseases, along with dense stands should be prioritized. These are the most frequently attacked.
- **Applying preventive insecticide sprays** which may aid in preventing mountain pine beetle infestation. Certain formulations that are registered and tested for effectiveness are the primary preventive for helping reduce the likelihood of attacks on individual trees. Consult your forester for proper use and be sure to follow the label instructions.
- **Designating "Trap Trees"** which attract recently emerged adult beetles. Once these trees are infested, remove and destroy them during fall or winter when insects are still inside.
- **Use of pheromone packets** may disrupt the attraction of incoming beetles and can be used to reduce attacks on pine trees where use of insecticide is not feasible, for example near water or structures where overspray would be undesirable. Be sure to consult your forester or local field office for more detailed information on using pheromone applications.

MINIMIZE EROSION - DEFEND YOUR DIRT

Plants are fed by healthy soil and soil is fed by the natural life cycle of plants. Soil depths, structure, and quality are key to sustaining healthy forests. Forest restoration can improve your soil and give it staying power in the face of the natural forces of wind and water.

The top layer of most healthy soils is loose and fertile, chock full of nutritious decomposing vegetation and a variety of organisms that teem with life. The roots of plants, shrubs, and trees help anchor the soil in place. Areas of bare ground lack this stabilizing feature and are susceptible to erosion from wind, water, and compaction. Erosion is a natural process that has shaped the landscape over time. But too much of it in the wrong places can mean exposed tree roots, destabilized hill slopes or compromised water sources with the next heavy rain.

If areas at risk for excessive erosion are identified during your baseline survey they may benefit from some kind of revegetation to help hold soil in place. Planting and seeding these areas can also provide wildlife habitat.

Post-fire erosion.

Revegetated slope post-wildfire.

REVERE YOUR WATER

It's the foundation of life - for you, your forest, your wildlife, and community. Nothing can live without it. Restoration of private forestland is key to protecting our water supply.

If you're fortunate enough to have any, your land assessment will identify all the natural water sources on your property. You'll want to plan to do whatever you can to fiercely protect this finite, vital resource. Most forest restoration activities go a long way toward enhancing water sources. The reduction of hazardous fuels alone will help reduce the risk of intense wildfire that can devastate them. There are additional actions you can take that will bump your stewardship to the next level and help you preserve what you have for the future.

These include:

- Limiting disturbance of wet areas
- Relocating materials that could degrade water, like fuels, oils, or fertilizers, far from water sources
- Creating buffers of vegetation to separate roads from water sources
- Building bridges or installing culverts at stream crossings
- Employing water control devices like diversions or retention ponds
- Stabilizing stream and pond banks by planting native vegetation
- Deflect water rushing around deep bends to prevent stream bank erosion
- Leave it natural! Some woody debris in water sources provides great cover and breeding habitat for aquatic species.

Managing for an appropriate level of wildfire.

MONITORING AND ADAPTING

Part of your plan will spell out a process for monitoring the effects of your restoration efforts on a regular basis. Why? To see if your restoration actions are creating the outcomes you want. How are the Aspen doing? Do we have new shoots and sprouts? Did the native seeds take hold on the stream banks? Are wildlife using the water ramp? How's the regrowth coming in the prescribed fire area? Are the cattle staying out of the new fenced area around the spring? Are there anymore beetles in that northwest ponderosa pine stand?

The answers to questions like these will tell you how you're doing. Record everything you see that's in question in a log, including date, time and location. If you're not seeing the results you planned for, check in with your forester who will help you make changes and try new approaches. Forests are systems of perpetual transformation. This continues even after the bulk of your restoration work is complete. Observe, evaluate, and pivot when you have to. Your forest and your community will thank you for it.

GETTING HELP

There are many sources of help and support for private landowners like yourself. Get to know your local technical assistance providers. Keeping a list of these people and organizations will be helpful during restoration and when it's time to update your plan.

FINDING PROFESSIONAL FORESTRY CONSULTANTS AND FORESTRY CONTRACTORS

You'll want to consider hiring a professional forestry consultant as well as forestry contractors to provide professional guidance and services that help you accomplish many of your restoration goals.

It's important that you have a business relationship with them that prioritizes professionalism, reliability, personal and worker safety, legal protection, protection of natural resources, and preservation of aesthetic and property value.

Choosing a contractor or consultant with a good reputation will help ensure that the forestry work will achieve the outcomes set forth in your restoration plan. In turn, your contractor will understand what you, the customer, expect, which will achieve the desired outcome.

IMPORTANT CONSIDERATIONS WHEN SELECTING A CONTRACTOR OR CONSULTANT:

- The Ministry of Forest, Lands, Resource Operations and Rural Development Resource Districts, as well as the Association of BC Forest Professionals maintain contractor and consultant lists for forestry services.
- Be informed and remember that agencies can't make recommendations.
- As you research candidate contractors you'll develop an overall profile and "feel" for each company.
- Pay particular attention to the condition and type of equipment/technology that the contractor advertises and uses. Equipment will affect operating costs, efficiency, production and the resource impacts on your land.

GET REFERENCES

- Reference checks will help you determine each contractor's experience level.
- Obtain at least three references from past customers.
- If possible, get references for the same kind of work that you'll require on your land.
- References should be for work done during the previous one to three years. This will help confirm that the company is stable and has good work and hiring procedures.
- Look for an online profile and/or website that you can peruse.

INSURANCE AND LEGAL COMPLIANCE

- Be aware that not all contractors and consultants are insured.
- Hire companies that are fully insured. You don't want to find yourself liable for an accident or any loss on your property.
- Validate automotive liability insurance, general commercial liability insurance, and Errors and Omissions (professional liability) insurance.
- Make sure they are in good standing with local, provincial and federal laws, including workers' compensation requirements.

SPOTLIGHT: Equipment and Machinery - Quality Pays Off Pay close attention to the quality, age, and condition of the equipment and technology that the company advertises. This affects efficiency, safety, costs, productivity, and the magnitude of environmental impacts on your land.

CREDENTIALS AND LICENSING

- Professional credentials and licensing will give you an overall sense of the strengths, professionalism, and ethics of each candidate.
- Specific licenses are required to perform certain types of forestry work.
- Confirm that they hold all required business licenses.
- Confirm they have a Commercial Pesticide Applicator's License if your plan includes spraying for pests or disease.
- Check on the contractor's professional certifications.
- Look for certified Arborists.
- Look for professional memberships in organizations like the Association of BC Forestry Professionals, Association of Applied Biologists. Some of these organizations require members to follow a code of ethics or membership guidelines.

GET QUOTES:

- Get at least three written estimates.
- Make sure you provide all contractors with the same information so they can all estimate costs accurately.
- Ideally, bring all potential contractors together in your project area at the same time so that each receives identical information.
- Be as specific as possible in the scope of the work.

CONTRACTS

Get. Everything. In. Writing. before signing any agreement or contract.

The contract does not need to be detailed. The level of detail will depend on the scope of your project. The size can range from a single page estimate to a longer form timber sale agreement.

Ensure you've obtained the necessary permitting for your works, including tree cutting permits or permits to work within an environmentally sensitive or riparian areas.

If you aren't comfortable with any aspect of the contract get some legal input or talk to a consulting or forestry professional.

SPOTLIGHT: Avoid One of the Most Common Mistakes Remember, the quote is only one aspect of the contractor selection process. One of the biggest mistakes is settling for the lowest quote. Your research on references, insurance and credentials should hold considerable weight in your decision-making process. Sometimes, a higher quote may mean that a contractor pays higher wages and benefits in order to retain a more stable, quality workforce. In some cases, operating costs may be high because a contractor's equipment is newer, or that they use higher-cost, lower-impact equipment to provide a better outcome with less environmental compromise.

WHAT'S NEXT? REACH OUT

CONGRATULATIONS!

If you've made it this far, pat yourself on the back because you now have a leg up in the wildfire risk-reduction game! You've educated yourself about the process resources that can help you sleep at night during fire-season, knowing you've done your part to protect and support the inborn resilience of your forest.

Contact **Vernon Fire Chief David Lind** for a conversation:

Phone: 250-550-3563

Email: dlind@vernon.ca

APPENDIX I: ADDITIONAL RESOURCES

SAMPLE FOREST RESTORATION PLANS

Oregon Forest Management Planning System Guidelines (Page 4 chart): http://blogs.oregonstate.edu/forestplanning/files/2018/03/Oregon_Forest_Management_Plan_Guidelines_2017Final.pdf

Template: http://blogs.oregonstate.edu/forestplanning/templates

SUGGESTED READING

WILDLAND-URBAN INTERFACE

BC Wildfire Service: www2.gov.bc.ca/gov/content/safety/wildfire-status

FireSmart Canada: firesmartcanada.ca

National Fire Protection Association: https://www.nfpa.org/News-and-Research/Data-research-and-tools/Wildland-Urban-Interface/Wildland-Urban-Interface

Fire Adapted Communities Learning Network: fireadaptednetwork.org

Washington State Fire Adapted Communities Learning Network: .fireadaptedwashington.org

Insurance Institute for Business and Home Safety: ibhs.org

Disaster Safety: disastersafety.org

Washington Department of Natural Resources Firewise Program: dnr.wa.gov/firewise

US Department of Agriculture, Forest Service, Rocky Mountain Research Station: https://www.fs.fed.us/rmrs/research-topics/wildlandurban-interface/science-spotlights

US Department of Commerce, National Institutes of Standards and Technology: nist.gov/topics/wildland-urban-interface-fire

Colorado State Forest Service: https://csfs.colostate.edu/wildfire-mitigation/colorados-wildland-urban-interface

State of Idaho Firewise Program: idahofirewise.org

Fire wise landscaping – Washington State University Extension: https://extension.wsu.edu/chelan-douglas/gardening/mg/firewise-landscapes

Minnesota Department of Natural Resources Firewise Program: dnr.state.mn.us/firewise/50things

Contact the City of Vernon for more information regarding permitting (Tree Removal or works within environmentally sensitive or riparian areas): https://www.vernon.ca/homes-building/permits-applications

FIRE SCIENCE

Association for Fire Ecology: fireecology.org

International Journal of Wildland Fire: publish.csiro.au/wf

Tall Timbers Fire Ecology Research Station: talltimbers.org/fire-ecology-program

Northwest Fire Science Consortium: nwfirescience.org

Northern Rockies Fire Science Network: https://www.nrfirescience.org

Southern Rockies Fire Science Network: southernrockiesfirescience.org

Fire Research and Management Exchange System: frames.gov

Canadian Interagency Forest Fire Center: ciffc.ca

National Interagency Fire Center (US): nifc.gov

International Association of Wildland Fire: iawfonline.org

APPENDIX: PHOTO REFERENCE GUIDE

UNDESIRABLE / NON-PREFERRED PLANTS

Antelope Bitterbrush

Bracken fern

Cheatgrass

Common Juniper

UNDESIRABLE / NON-PREFERRED PLANTS

Douglas-Fir

Rabbitbrush

Rocky Mountain Juniper

Sagebrush

Subalpine Fir

Western Redcedar

DESIRABLE / PREFERRED PLANTS

Birchleaf Spirea

Bitter Cherry

Buckbrush

Cottonwood

Currant

Douglas Maple

DESIRABLE / PREFERRED PLANTS

Elderberry

Kinnickinick

Mockorange

Oregon Grape

Paper Birch

Ponderosa Pine

DESIRABLE / PREFERRED PLANTS

Red Alder

Red-Osier Dogwood

Saskatoon

Snowberry

Soapberry

Sumac

DESIRABLE / PREFERRED PLANTS

Thimbleberry

Trembling Aspen

Utah Honeysuckle

Willow

Woods Rose

CREDITS

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Producer: R.W. Gray Fire Ecology Consulting

Writer: Marjie Brown — Website: thefirewriters.com

Illustrations:

Robin Carlson — Instagram: @anthropocenesketchbook

Miriam Morril — Instagram: @pyrosketchology

Laura Cunningham — Website: lcunningham-art.com

Layout / Design: Reason R. — Website: Upwork profile