EAGLE POST 54

The newsletter of ***ESWA - EAGLE SUMMIT WILDERNESS ALLIANCE*** apprises you of important activities in and around Eagles Nest, Holy Cross, and Ptarmigan Peak Wilderness Areas.

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VIEW IN BROWSER

BEFORE WE BEGIN - a few ESWA updates:

Prizes and awards have been bestowed on several ESWA movers and shakers:

- **CINDY EBBERT** won a national award from the Forest Service - LINK
- **CYNDI KOOP** was awarded the ESWA prize for Wilderness stewardship - LINK
- **TOM LAWSON** won the VWR of the year award - LINK
- **STAN WAGON** won the ESWA Photo Contest - LINK
- **KEN HARPER** & **ELLIE FINLAY** were given ESWA sawyer awards - LINK

ADVOCACY - a lot is happening, and we'll be sending out our special Advocacy Update to you in a couple of weeks.

November 2020

Dear *|FNAME|*

Greetings! Our topic this month:

The Beauty of Old-Growth Forests

David Brewster

INTRODUCTION

Introduction: This month's essay provides thought-provoking insights about the benefits of old-growth forests. This information should help inform the debate in Summit and Eagle Counties, and throughout the West, about the role of clear cutting, thinning, and other forms of "forest management" on our public lands. This debate gets hotter as the WUI - the wildland urban interface - extends farther into our forests. The author, Dave Brewster, also presents the case for the carbon-

capturing benefits of our remaining old-growth forests.

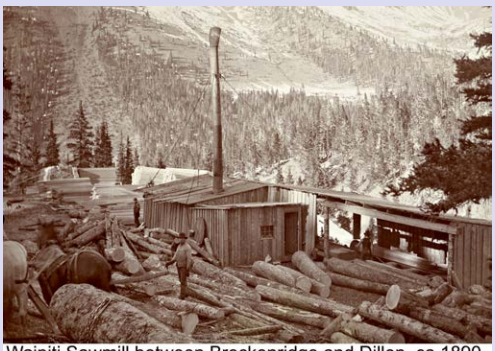
The Beauty of Old-Growth Forests: Lodgepole vs. Spruce-Fir,

by Dave Brewster

We who live in the mountains are constantly reminded about the dangers of wildfires - in newspapers and local presentations, and by smoke in the air. Especially vulnerable are the Lodgepole Pine forests that seem to be everywhere. So we create defensible spaces and manage our forests by clearcutting large swaths, burning the cuttings when safe. While we must take steps to protect our homes, there is another side to this story. When we cut large areas we are actually damaging forest health, creating long-term wildfire problems, and perpetuating our young, problematic Lodgepole forests. We lose much when we prevent the development of old-growth forests.

A clearing in Spruce-Fir forest in the Gore Range

While the nature of old-growth forests varies greatly with geography, many of us envision giant trees with moss on the branches forming canopies above with shade-loving flowers and bushes below where small animals and birds hide. Small nursery trees in the cool shadows wait their turn when the giant trees fall leaving sunny gaps where sun-loving flowers and bushes thrive. Woodpeckers and flickers thump dead trees making burrows for owls and other birds. Decaying logs hide a rich community of fungus and insects. Yet we only see half of an old-growth forest; the other half is below the hummocky, irregular mossy ground where a complex network of decaying wood, roots, fungus, insects, and burrowing creatures help bind the forest together. Everything in the forest is interconnected and affects the rest, even creating its own microclimate. The biologic diversity of ages and types of plants, insects, animals, and moisture retention make these forests more resistant to insect infestations, disease, drought, and wildfire.

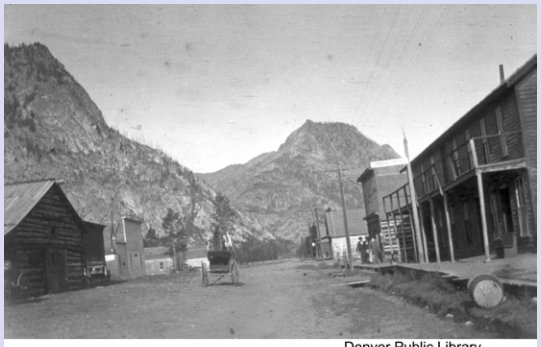


Waipiti Sawmill between Breckenridge and Dillon, ca.1890

History Colorado. Accession #95.200.749 (printed with permission)

Most of us from the Midwest and the Coasts are familiar with the remaining old-growth forests there, where giant deciduous trees are many hundreds of years old. On the West Coast, the plight of the last coastal Redwoods and giant Sequoias is well known. Old-growth ecosystems once covered most of the planet, yet today many children have no idea what the natural appearance of the land surrounding them would be if it were undisturbed. These are some of the most complex and diverse ecosystems on the planet. We are still striving to understand

them; they are revealing new secrets every year.



Old Frisco ca 1890 Denver Public Library, Western History Collection, X-8562. printed with permission

What do old-growth forests in the southern Rockies look like? Two hundred years ago, most of the forests of this area looked very different. Since then, much of the forest, especially at lower elevations, has been cut or burned. The miners and railroads had a voracious appetite for lumber and firewood, with more lumber shipped out by rail to nearby areas. Many fires were set both accidentally and intentionally to clear forests.

Spruce and Fir growing into a Lodgepole forest hit hard by beetles in the Gore Range

The diverse forest of the past contained many types of trees with a variety of ages and sizes, including Subalpine Fir and Engelmann Spruce, with Aspen and Lodgepole in disturbed areas. Remnants of two- to four-foot diameter stumps can still be seen occasionally in the present-day forests of densely packed, slender Lodgepole Pines. The remaining Spruce-Fir forests are moister, noisier places than Lodgepole forests, and contain a greater number and wider diversity of understory plants, insects, and animals. These forests are more resistant to insects, disease, drought, and wildfire than our current common monoculture of similar-aged Lodgepole trees. When we look now, we generally see Spruce and Fir up high and Lodgepole down low. Most of us assume that the predominant trees are a function of elevation. What we don't see is forest succession taking place.

Succession is a core concept of ecology - it explains that following a disturbance, such as a flood, avalanche, fire, or insect infestation, pioneer species appear first. These sun-loving species (Aspen and Lodgepole in our area) improve the soil, create shade, and make other changes that make the habitat more favorable for other species, like shade-tolerant spruce and fir. Experts say if left to grow naturally, Fir and Spruce will replace nearly all the Lodgepole Pines and many Aspens in the subalpine regions of Colorado (9000' to near treeline). In most of this region the Fir and Spruce form a permanent climax forest, which is one that will not change unless environmental conditions change. Only in a few warm, dry places with deep, well-drained soils between 8200' and 9300' may Lodgepole Pines be the climax vegetation, but this is rare in the Rockies [1]. The Aspen forests, like mature Spruce-Fir forests, sustain rich and diverse flora and fauna and are our most fire-resistant forest. While they are often early pioneers after a disturbance, they are generally transitional giving way to spruce-fir over time.

This succession can occur within 50 years, but may take over three centuries when pioneer vegetation is dense [1]. Achieving a true old-growth climax forest requires several generations of trees, so it can take much longer. Unlike animals, trees grow until near the end of their lives and the larger they become the faster they add carbon, the major component of wood [2]. The largest 1% of trees in an old-growth forest equals over 50% of the total carbon-containing biomass in the forest [3]. If a tree can avoid disease, drought, and other hazards, it reaches old age. In old age, eventually fungal decay, breaking down wood and releasing carbon, outpaces tree growth and causes the tree's collapse. Trees spend much of their energy making chemicals to prevent this, and many live surprisingly long. The oldest known living Bristlecone Pine in Colorado is 2,464 years old, Limber Pine 1,661 years (South Park), Douglas-fir 1,275 years (Northern New Mexico), Englemann Spruce 911 years (central Colorado), Subalpine Fir 501 years (Canada), and Aspen 317 years (Rocky Mtn. Nat. Park) [4]. So perhaps it is not surprising that some old-growth Spruce-Fir climax forests have trees over 120' tall, three feet in diameter, and 400 years in age [1].

Although climax forests are longer lasting and more sustainable than Lodgepole or Aspen forests, they are still subject to natural processes such as avalanches, floods, disease, and fires. These tend to be isolated events instead of forest-wide catastrophes. The open meadows and patches of Aspen and Lodgepole forests that are created add to the biodiversity, stability and health of the entire system.


Mychorrizal Fungi Below-Ground Network

While the health of the above-ground forest is easily seen, the health below ground is also very important. Spruce-Fir forests tend to have soil enriched in carbon from forest litter (leaves, twigs, etc.) and fallen logs decaying on the forest floor. Lodgepole and Aspen forests usually get their start on more barren, drier soil. As they drop litter and trees fall they enrich the soil, encouraging the growth of Spruce and Fir trees. Soil carbon is very valuable, as it reduces erosion by binding clays while retaining moisture and nutrients, creating more productive soil. It releases groundwater slowly, retaining water for plants and reducing runoff and flooding. The dead and decaying wood supports a rich flora and fauna of microbes, mosses, fungus, and invertebrates as well as the animals that consume them. Soil carbon encourages growth in the invisible half of the forest (roots, fungus, etc.). The below-ground fungal networks, specifically mycorrhizal fungi, develop slowly over decades and centuries, interconnecting with tree roots. These fungi are very good at breaking down rocks, providing minerals and water to the trees in exchange for sugars from the trees that allow them to live. They also provide conduits for trees to share other chemicals with other trees, including plant hormones. Some

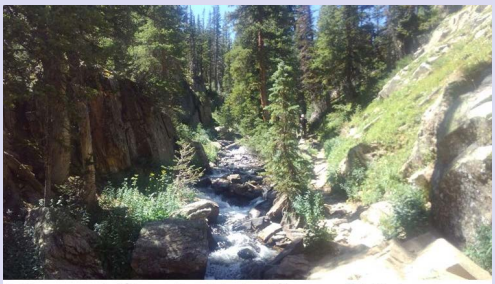
researchers refer to this as the “Wood Wide Web” [5]. Each tree responds to its environment, including attacks from disease and insects, by producing hormones that trigger the production of chemicals to fight the invaders. Through the fungal network, trees actually warn one another about threats as well as share nutrients. When the trees are cut, this fungal network dies too. Altogether, carbon below the ground is about 50% of forest carbon [6].

Old-growth forests store large amounts of carbon, both above and below ground, keeping it out of the atmosphere and reducing global warming. While the growth of young trees is more obvious, older trees are sequestering carbon faster and store far more carbon. Experts estimate the forests in the mountains of Colorado store about 17-28 metric tons of carbon/acre [7]. Hence Summit County’s 222,447 acres of forest [8] hold 3,800,000 to 6,200,000 metric tons, or about five or six times Summit County’s total yearly emissions. The Summit County Action Plan estimates that the forests in Summit County could grow and store about 10% of Summit County’s emissions each year [9]. Clearcutting and burning kills above- and below-ground life, releases the carbon into the air, and degrades the soil. Burning does return some of the minerals to the soil, but much is lost in runoff. Simply replanting is not the answer; growing existing trees intact will sequester more carbon than newly planted and young trees.

Of course wildfire releases this stored carbon, and fire does play an important role in shaping some types of forests. Ponderosa Pine forests (found at lower elevations) naturally have ground fires that burn the underbrush and saplings. This keeps the area open and maintains a wide tree spacing allowing enough water and nutrients to keep each tree healthy. The Ponderosas have thick fire-resistant bark and are only rarely hurt by these fires. Similarly, Lodgepole forests require fire to prevent natural succession and have some adaptation to fire. Since these forests are typically drier and more densely spaced, they are also more prone to fire with natural recurrence rates of 35 to 200 years [10]. When fire is suppressed and these forests are overgrown, they can have intense crown fires that burn all the carbon and sometimes even sterilize the soil, slowing regeneration. When fires are allowed to occur regularly, they are less intense. Then Lodgepole seeds can survive in their cones, being released only after heating, with seedlings sprouting quickly. Fire does not naturally play a major role in the high elevation Spruce-Fir forests of central Colorado with a mean recurrence interval of 300 years [11].

There was a time when there were enough large trees to support mining and construction in Summit County, but now our economy depends on recreation. Viewing and visiting a mountain meadow surrounded by forests is enjoyable, but tourists aren’t flocking to view and visit hundreds of acres of clearcut. Demands to “manage” the forest usually mean clearcutting or selective cutting. Clearcutting is expensive, destructive, and never ending. Clearcutting is touted as a way to mimic forest fires; unfortunately, it mimics many of the worst aspects of wildfires. Clearcutting not only takes out the trees, but much of the undergrowth. What remains is unlikely to survive since it is now in a drier, sunnier location with larger

temperature swings. Most of the below-ground life and insect life that depend upon the vegetation die as well. Birds and animals lose their habitat and are driven from the area. After a section of forest is clearcut, mud, silt, and sand are washed from the exposed soil and erosion control is often required. Noxious weeds then have an opportunity to invade the disturbed soil, requiring monitoring and treatment. When the trees grow back, the tree seedlings, almost all Lodgepole Pines, generally grow back so densely that hand thinning is required to prevent forest growth from stalling. The resultant forest is almost all one species and one age: optimal conditions for an insect infestation or disease and not good for wildlife. Finally, in 30 years or so, the forest needs to be clearcut again. So-called selective cutting, which leaves a few trees standing, suffers from the same issues. The isolated trees, not adapted to their new surroundings, are often blown over.


Missouri Creek, Holy Cross Wilderness

Arguments that cutting creates healthier forests, preserves and improves water quality, helps sequester carbon, and makes economic sense are deeply flawed. So we are stuck with widespread, problematic Lodgepole forests that we actively “manage” to mitigate the risk of wildfires [12]. But this prevents natural succession from transitioning to more desirable and less risky Spruce-Fir forests that often mature into beautiful old-growth forests. Climate change is increasing the vulnerability of our Lodgepole forests and making the transition to Spruce-Fir more difficult. Conditions favorable for rapid succession are increasingly interrupted by hot, dry conditions. Wildfire buffer zones are essential, and carefully placed fire breaks could help isolate fires, but widespread clearcutting only exacerbates the problem by perpetuating problematic Lodgepole forests. We are fortunate that many nearby areas are on the path to becoming old-growth forests, but even in the Wilderness it is a slow process and the pressure to “manage” the forest grows ever stronger.

Current and recent logging in Summit County includes around Miner’s Creek, Peak 7, French Gulch/Prospect Hill, Maryland Creek, Harrigan Creek, Slate Creek, Brush Creek and Spring Creek [13]. On the Eagle County side of the Eagles Nest Wilderness, Wilderness advocates and residents alike will watch intently as details emerge about the current "forest-management" proposals from the Town of Vail, the U.S. Forest Service, Vail Resorts, and The Nature Conservancy. The Vail Valley Forest Health and Fuels project would conduct logging and other “fuels-mitigation” activities on almost seven square miles or 4,400 acres, over half of which is in the Eagles Nest Wilderness. The purported justification is to reduce fire risk to adjacent properties. These activities would impact the popular Booth Creek area, and the less-well-known and pristine Spraddle Creek and Bald Mountain areas. Prescribed burning, chainsaw work, manual pruning, and mechanical logging – along with road construction - are included in the proposed work. The Town of Vail entered into an August 4 cost-sharing agreement with the Forest Service, but the details of the work

to be done have not been developed or shared with the public. Meanwhile, near Breckenridge, the Nature Conservancy is working with Vail Resorts to determine if clearcut Lodgepole Pine areas in the wildland-urban interface can be replaced with less-flammable hand-planted Aspen forests, to provide an “attractive natural fuel break” between forest and developed properties. [14]

About Dave Brewster: Dave grew up a science nerd in Detroit, but loved the annual family vacations to the pine forests of the Upper Peninsula and the frequent Boy Scout outings to the hardwoods of southern Michigan. Becoming a geologist/geophysicist he hoped to be able to spend time enjoying nature. After 36 years in the office, he retired to Colorado, finally getting his wish. Dave enjoys clearing trails as a certified sawyer, learning about ecology and botany (including CSU’s native plant master courses), and locating and pulling noxious invasive weeds with ESWA’s WeedSpotters. Wishing to give back a small part of what he gets from the Wilderness, Dave is active with ESWA, FDRD, VOC, WRV, and other volunteer organizations. You may see him in the forest as an ESWA Volunteer Wilderness Ranger or a “Ski with a Ranger” volunteer with FDRD.

FOOTNOTES:

1. 1991, Rev. 2008 A Naturalists Guide to the Southern Rockies Audrey DeLella Benedict; 1993 Grassland to Glacier, C.F. Mutel and J.C. Emerick.

2: 2012 Senescence, aging, and death of the whole plant, Howard Thomas, Tansley Reviews

2014 An Old Tree Doesn’t Get Taller, But Bulks Up Like a Bodybuilder, Richard Harris, Morning Edition NPR LINK

2014 Do Trees Die of Old Age, Ross Pomeroy, Real Clear Science LINK

3: 2020 Wild Carbon & Wild Forests, Old-Growth Forest Network, from Maloof, J. and V. Goold. 2020. Recent findings on carbon storage in old-growth forests. An online publication of the Old-Growth Forest Network. www.oldgrowthforest.net.

4: 2019 Rocky Mountain Tree-Ring Research, LINK

5: The Hidden Life of Trees: What They Feel, How They Communicate—Discoveries from A Secret World, Peter Wohlleben. Peter Wohlleben

6: LINK

7: 2011 A Synthesis of current knowledge on forest and carbon storage in the United States, D. McKinley, et.al, Ecological Applications, 21(6), 2011, pp. 1902–1924, the Ecological Society of America

8: 2011 Guide to Forest Health, Forest Health Task Force: Existing Tree Cover 222,447 (CoGAP data)

9: 2019 Summit County Climate Action Plan (CAP): Summit County Emissions a little over 800,000 mt of CO2e per year

10: 2012 Fire regimes of the conterminous United States, U.S. Department of

Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Link
11: LINK
12: 2016 Summit County Community Wildfire Protection Plan. LINK
13. LINK LINK
14. LINK LINK

COLORADO GIVES DAY is December 8. It's a convenient way to donate to all of your favorite Colorado non-profits, like ESWA. You can donate any time through December 8.
Click HERE to learn more.

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Join us! Next **Planning Meeting**
Thursday, November 12 at 5:30 PM via Zoom. Questions? Send us an email.

CITY MARKET COMMUNITY REWARDS PROGRAM
Please register your City Market Value Card, linking it to ESWA, which will send rebates to us without compromising your earned fuel points. Please note that each card holder may only sign up for one tax exempt organization. **THANKS!**

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A huge thanks to ARAPAHOE BASIN SKI AREA. For more than two decades, A-Basin staff have donated generously to their **Employee Environmental Fund**, of which ESWA has been a steady beneficiary. Last year, more than 150 employees donated, led by A-Basin Director **Alan Henceroth**. Our

enduring THANKS to them.

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