

FALL 2019

Biomass Supply

Emerging technologies & enabling conditions

Log Market Report

Current prices and trends

Regional News

Klamath Basin, Baker County, Northeast Oregon

Invasive Species Series

Grand Fir: Is it really so grand?

Juniper: Too much of a (good?) thing

Tree-of-heaven: A not-so-heavenly invader

In this edition we focus on three tree species that can be considered invasive in Eastern Oregon. Tree-of-heaven is a true, non-native, invader becoming increasingly common at urban edges and throughout the Columbia Gorge. Grand fir and western juniper are native species that are expanding beyond their historic ranges and stocking levels. We hope the information we provide will encourage appropriate management of these species.

Life on the Dry Side

Serving land managers and owners east of the Cascades



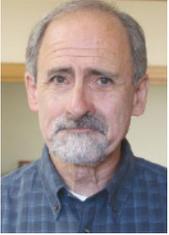
Oregon State
University

Life on the Dry Side

OSU FORESTRY & NATURAL RESOURCES NEWSLETTER

Serving land managers and owners east of the Cascades

CONTRIBUTORS



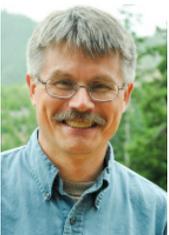
Daniel Leavell

Extension Forester Klamath, Lake, and Harney Counties
6923 Washburn Way,
Klamath Falls, OR 97603
541-883-7131
daniel.leavell@oregonstate.edu



Nicole Strong

OSU Extension Central Regional Director - Confederated Tribes of the Warm Springs, Crook, Deschutes, Gilliam, Hood River, Jefferson, Morrow, Sherman, Wasco, and Wheeler Counties
nicole.strong@oregonstate.edu



John Punches

Extension Forester Union, Umatilla, and Wallowa Counties
10507 N McAlister Rd,
La Grande, OR 97850
541-963-1061
john.punches@oregonstate.edu



Jacob Putney

Extension Forester Baker County
2600 East Street,
Baker City, Oregon 97814
(541) 523-6418
jacob.putney@oregonstate.edu

IN THIS ISSUE

3 Log Market Report

Current prices and trends

4 Invasive Species Series: Grand Fir

Is it really so grand?

6 Invasive Species Series: Juniper

Too much of a (good?) thing

9 Northeast Oregon News

Forest technician training program & fire on the landscape

10 Biomass Supply

Part 3 of 4: Emerging technologies & enabling conditions

13 Baker County News

Welcome to our new Extension Forester, Jacob Putney

14 Invasive Species Series: Tree-of-heaven

A not-so-heavenly invader

17 Klamath Basin News

Change is in the air for Extension Forester, Daniel Leavell

Back Cover: Are you ready for winter?

Fall to-do list



Oregon State University
Extension Service

Our Oregon State University Forestry and Natural Resources agents serve all counties in Oregon. Find your local office and agent at: www.extension.oregonstate.edu/find-us

Log Market Report

Data courtesy John Lindberg (Oregon Log Market Report), supplemented by John Punches

Do you want the good news, or the bad news? The bad news is that prices for small diameter pine have slipped yet again. The good news is that prices for pine 12" dbh and up held relatively steady, as have those for Douglas-fir and white woods. The mills I've driven past recently all appear to have significant inventories, so I wouldn't bank too heavily on a winter premium for local logs. As always, the prices reported here are generic – markets fluctuate so consult log buyers directly as you plan sales. If you're known for providing high quality wood your log buyer may be able to sweeten the offer.

Our markets seem to be stuck in the doldrums, and my crystal ball isn't giving me any indication of an impending spike in prices. Rather than waiting for a hoped-for price jump, focus on good forest management. What you do today to keep your forest at a healthy level of stocking

will pay off in the future. Waiting for perfect market conditions could leave you with heightened levels of forest mortality, and increased risk of catastrophic wildfire.

When considering a harvest make sure you have a clear agreement with your logging contractor about what will be done. As the timber owner you should stipulate what areas will be harvested and what will be retained, how much will be cut, and what species will be emphasized during harvest. The agreement should also cover slash management, road repair, harvest timing, protection of any resources you consider to be special, and compliance with forest practices rules. For more info on selecting a logging contractor, check out Extension manuscript EM9170, available at <https://catalog.extension.oregonstate.edu/em9170>.

LOG MARKET REPORT \$/1,000 board feet (or ton)							October 15, 2019		
Umatilla/Pendleton									
Douglas-fir/Larch	Ponderosa Pine				Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)	
	CR	6-11"	12-18"	19"+					
350		250	300	350	320	285	285	34 - 38	
La Grande/Elgin									
Douglas-fir/Larch	Ponderosa Pine				Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)	
	CR	6-7"	8"+						
430		270	310		320	270-310	270-310		
Pilot Rock									
Douglas-fir/Larch	Ponderosa Pine				Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)	
	CR	10-11"	12-16"	17"+					
		330	390	430					
Burns/John Day									
Douglas-fir/Larch	Ponderosa Pine				Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)	
	CR	8-11"	12"+	16"+					
8"+ 340		260	325	380	8"+ 220			23	
Redmond/Bend/Gilcrist									
Douglas-fir/Larch	Ponderosa Pine				Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)	
	CR	6-13"	13-15"	16"+					
		280	345	375		330			
Lakeview/Klamath Falls									
Douglas-fir/Larch	Ponderosa Pine					Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)
	CR	6-11"	12-16"	17-23"	24"+				
			250	350	385	8"+ 310	8"+ 200		
Lewiston ID									
Douglas-fir/Larch	Ponderosa Pine					Grand/White Fir	Lodgepole Pine	Englemann Spruce	Pulp/Chip Logs (ton)
	CR	6-7"	8-14"	15-20"	21"+				
420-450		260	260	340	340	420-450	400-430	400-430	

Grand Fir: Is it really so grand?

By Jacob Putney, Extension Forester in Baker County

Whether you call it white fir or grand fir, you've probably seen it lurking in the understory of drier ponderosa pine stands, or as a more dominant component in the higher elevations. Though it's a native species, ranging from northern California to southern British Columbia, the Rocky Mountains of Idaho and Montana, and the Blue Mountains of northeast Oregon and southeastern Washington, it is often thought of as having "invasive" qualities due to its shade tolerance and ability to persist in the understory in dog-hair thick densities.

In the mixed conifer forest types of Eastern Oregon, grand fir (*Abies grandis*) is an indicator of more productive sites, or sites with a higher moisture availability. It is characterized as a shade-tolerant species, which can persist in the understory, and grows well on more moist sites. In mixed-conifer forests, it typically grows faster than pine, larch, and Douglas-fir, particularly in the absence of fire. However, grand fir is quite susceptible to stem decay, root disease, numerous insects, and to mechanical damage. Expect high levels of mortality during periods of drought, outbreaks of fir engraver, or in pockets of root rot.

Mature grand fir can reach heights of 130-160 feet and have a diameter of 20-40 inches within the inland forests. It has a well-developed taproot, allowing it to be moderately drought tolerant, although not as tolerant as species such as ponderosa pine or western juniper. Grand fir establishes well on disturbed sites, particularly after silvicultural treatments. Seedlings and saplings have thin bark, making them sensitive to even low intensity fire or by damage during harvesting or other treatments. It can be identified by its flattened, dark-green, waxy needles that are silvery-white on the bottom.

For more information of grand fir's characteristics, check out: <https://www.fs.fed.us/database/feis/plants/tree/abigra/all.html>



Grand fir (*Abies grandis*).

ITS INVASIVE NATURE

The species' high tolerance to shade allows them to regenerate prolifically in the understory of these mixed-conifer forests. Historically, the young, vulnerable seedlings and saplings would be consumed by regular, low intensity fire. However, more than a century of fire suppression efforts, as well as selective logging of more valuable pine and larch, have created an accelerated succession of these forests to conditions where grand fir and other less fire-intolerant species are more dominant.

Grand fir is still a commercially valuable species, and it has the ability to carry a considerable amount of stand volume. However, its value compared to pine and larch and its susceptibility to various pests and diseases often preclude it from being a primary management species. The wood is less resistant to decay, and isn't as strong compared to other conifer species. Ignoring grand fir, however, can put your forest at risk. Its ability to persist in the mid- and understory can create a buildup of ladder fuels and create a high risk of crown fire.

WHERE IT'S GRAND

Grand fir still offers a variety of benefits and uses, the most common being its use for wildlife or as a Christmas tree. Because it is so susceptible for pests and diseases, grand fir can be a good candidate for wildlife trees, and eventually for down woody debris that can be used as habitat for some species. Pileated woodpecker (*Dryocopus pileatus*), for example, is a species that roosts in cavities of grand fir trees, both live and dead.

Although it's less valuable than other conifer species, there are still opportunities for management if it's a component of your forest. Grand fir is quite tolerant to shade, competition, and snow (only in older stands). It also responds well to being released through opening of the canopy. Maintaining grand fir tree vigor, and a component of other conifer species, is key in maintaining forest resilience.

If you have grand fir in your forest, consider your management objectives. Do you want to create more habitat for wildlife? Do you want to reduce wildfire risk? A good rule of thumb is to keep grand fir at less than a third of the stand's potential stocking level. This can help avoid problems with insects and disease, and keep regeneration at a more manageable level.



Grand fir and Douglas-fir mid- and understory, with a ponderosa pine overstory.



Dense grand fir understory.



Grand fir's symmetrical, conical crowns make excellent Christmas trees.

Juniper: Too much of a (good?) thing

By Daniel Leavell, Extension Forester in Klamath & Lake Counties

Thousands of years ago, in what is now the expanse of Eastern Oregon, natives belonging to the Northern Paiute, Cayuse, Sahapyians, and maybe the Nez Perce nations would use various pieces and parts of a local, brushy tree species scattered throughout the area in sparse clumps – or ancient, full-crowned, shaggy individuals. The bark could be shredded and used for rope or clothing, the leaves for a tonic and laxative and for treating toothaches, and the berries for a diuretic.

Decoctions were used for kidney problems, fevers, stomach aches, and hemorrhages. The branches were burned in sweat baths and gave off an aromatic smoke that eased rheumatism and headaches. Cones were ground into a flour, mixed with other wild grains and baked. The shaggy bark would be crushed and tightly woven around the end of a stick, ignited, and carried burning to the next campsite. Indigenous and migratory birds ate the berries of this tree/shrub and mammals browsed the new growth each spring.

HISTORIC VS MODERN DISTRIBUTION

Western juniper (*Juniperus occidentalis*) had many uses for native peoples and wildlife. The problem was – prior to European settlement of the West – juniper was relatively scarce. According to the USDA, Fire Effects Information System (FEIS) (<https://www.fs.fed.us/database/feis/plants/tree/junocc/all.html>) western juniper is “sensitive to fire. Crown and severe surface fire kills trees of all age classes, although mature trees with thick bark may survive low-severity fire, and sometimes moderate-severity fire.” Historically, mature juniper (this species can

For more information of western juniper’s characteristics, check out: <https://www.fs.fed.us/database/feis/plants/tree/junocc/all.html>



Western juniper (*Juniperus occidentalis*).

live to 300/400 years with an individual documented to be 1700 years old) was located in scattered clumps or as sparsely populated individuals adjacent to rim rocks, poor/thin soils, and other “refugia” from concentration of fuels resulting in mixed to moderately high intensity fires. (Miller, R. F., Bates, J. D., Svejcar, T. J., Pierson, F. B., & Eddleman, L. E. (2005). *Biology, ecology, and management of Western Juniper*. Oregon State University Agricultural Experiment Station, Technical Bulletin 152. 77p.)

F.L. Moravets described the 1936 extent of juniper woodlands in Lake County (Forest Statistics for Lake County, Oregon, 1936, USDA, PNW Experiment Station) as: “Western juniper is found in small, scattered stands throughout most of the county, but in only two locations does it occur over a large enough area to form a distinct zone. These two areas are in the northern part of the county, one being of considerable extent and the other small. The juniper stands in these zones are usually composed of short and bushy trees from 5 to 25 feet in height with rough, poorly-formed boles of use only for fuel wood or fence posts.”

WESTERN JUNIPER'S EXPANSION

Due to many factors, primarily fire suppression, but also livestock grazing and introduction of weedy species, juniper’s distribution (>10% crown) mushroomed from 420,000 acres throughout Eastern Oregon in the 1930’s – to over 2,200,000 acres in an inventory conducted in 1988 and reported in Gedney, et. al., 1999: (http://juniper.oregonstate.edu/bibliography/documents/php10IKHn_Gedney.pdf). Azuma, et., al. (2005), estimates 3,000,000 acres (https://oregonexplorer.info/data_files/OE_location/lakes/documents/pnw_rb249.pdf). Juniper savanna (those areas having less than 10% crown cover) exists on more than 2 million additional acres.

Approximately 60 to 80% of all western juniper currently in Eastern Oregon is therefore less than 100 years old. The expansion of western juniper throughout Eastern Oregon is dramatic – with equally dramatic consequences. Obviously, western juniper is very successful in the dry, eastern Oregon environment.

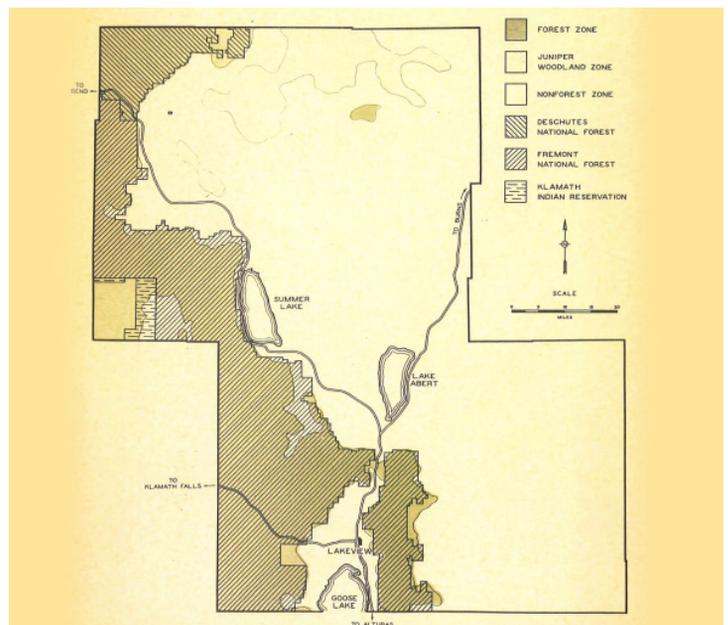
There are many reasons for western juniper’s success – and for the phenomenal growth in distribution. Western juniper has a multi-layered root system with a taproot that extends deep into parched and rocky soils. The



Western juniper is highly sensitive to fire.



Western juniper expansion at Keystone Ranch, Ochoco Creek, Crook County, Oregon.



Lake County juniper distribution as of the 1936 USDA inventory.

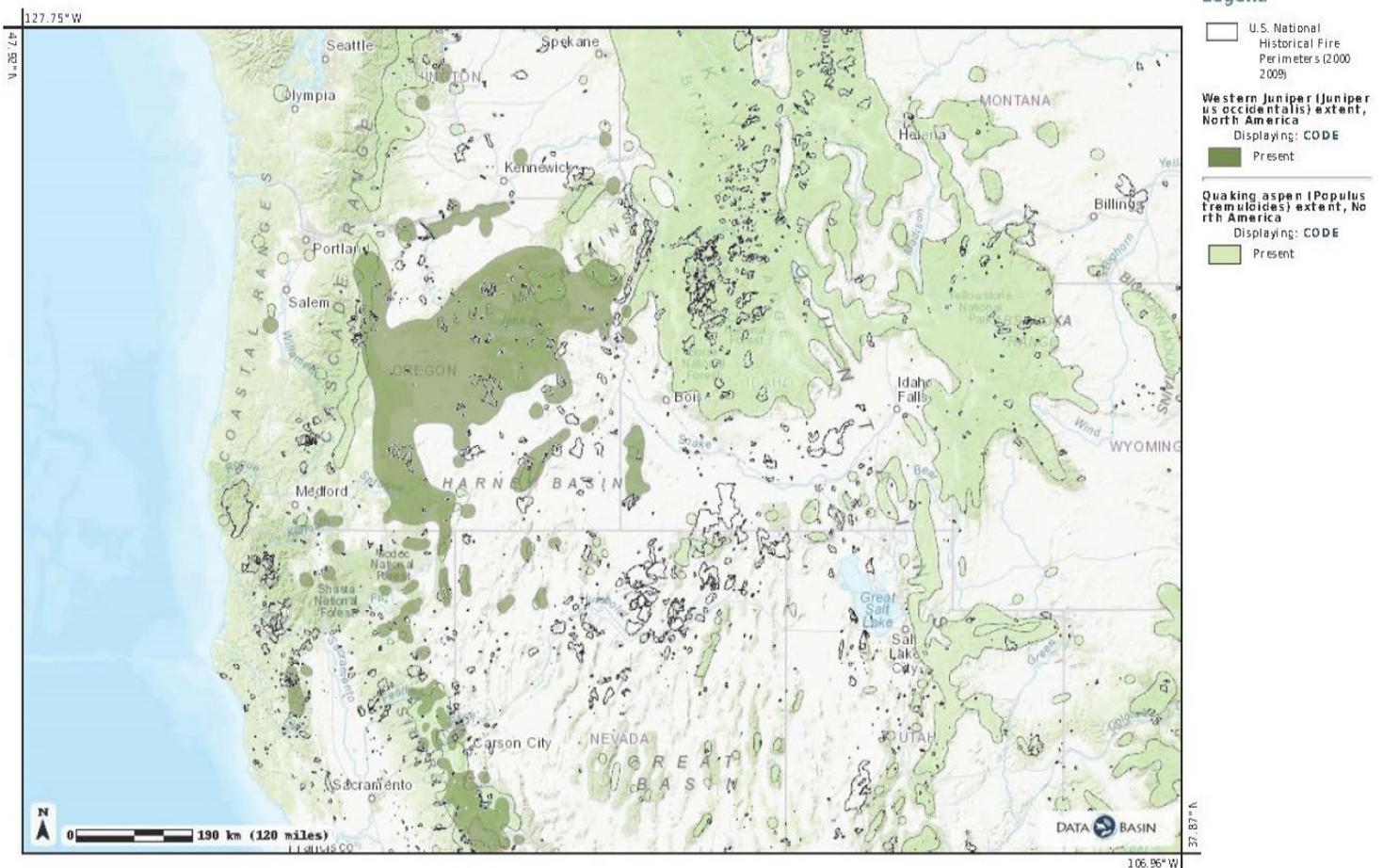
lateral extent of the root system can extend over 100 feet from the dripline of the canopy. (In comparison, most other conifers have shallow root systems lacking taproots, and their roots seldom extend beyond the dripline of the canopy). Juniper roots have adapted to seek out sparse water to ensure establishment and competitive success. The western juniper root system pumps gallons out of the soil to the canopy each day. The canopy of western juniper also produces allelopathic compounds that suppress the germination and establishment of any competition (www.researchgate.net/publication/262137785_Understory_Species_Response_to_Utah_Juniper_Litter). In the absence of repeated fire, western juniper is adapted to succeed better than any competition within its ever-expanding range.

Western junipers, like most native plant species, have a positive role to play in the grand scheme of ecosystem

function in Eastern Oregon. Over thousands of years, western juniper density and distribution responded directly to the annual wildfires that burned across the extent of the Oregon Outback. Either caused by natives burning – or by seasonal lightning – western juniper was caught up in response and grew in scattered areas of refugia, or where spaced out individual trees missed the effects of fire, growing to massive, shaggy, old growth trees. Birds and animals made use of this juniper tree habitat, as did the later humans occupying the landscape.

In the modern era, western juniper still has a role to play in the ecosystem – both natural and human. If eliminated, this beneficial role will be unfulfilled. If managed to the densities, distribution, and age classes to which the species has historically adapted – all can benefit.

Present day juniper distribution. Map credit: Data Basin, Tessa Hanson, 2019.



NORTHEAST OREGON NEWS

John Punches, Extension Forester in Union, Umatilla, & Wallowa Counties

FOREST TECHNICIAN TRAINING PROGRAM

In our summer edition I noted that we were kicking off a training series to build capacity for writing forest management plans in this corner of the state. Four talented technicians (and one brave PSU intern) recently completed the program. The training series included sessions on the region's forest types and environmental conditions, forest health challenges, fire history and risk reduction techniques, forest practices rules, and sources of assistance. The trainees developed three training plans (each) with mentors. Along the way we collectively developed a GIS-based data collection tool that allows for easy collaboration on plan production, and we refined the basic forest management plan template to make it more user-friendly and informative.

The technicians are now actively engaged in developing additional plans for family forestland owners. They are still working with mentors, but I can attest that it takes less mentoring with each plan developed. These plans allow landowners to qualify for NRCS financial assistance for fuels reduction and forest health improvement projects, and the cost of the plans is fully covered by NRCS. Best of all, the feedback from landowners to date has been that these plans are truly useful – with easy-to-understand descriptions of their forest stands, pragmatic management recommendations, helpful information on forest insects and disease, and a suite of customized maps. The plans also include photo documentation of current and desired forest conditions. If you don't have a current forest management plan, check with your local ODF Stewardship Forester to see if you can have a basic plan written for your property.



FIRE ON THE LANDSCAPE

Wildfire pays no attention to property lines or political boundaries, so why should forest restoration education? In that spirit, 30+ landowners and natural resource managers gathered in Walla Walla, WA, on October 23 to discuss how long term fire suppression, climate factors, and management practices, have impacted the region's forests. We then considered actions landowners can take to reduce fire risk to their structures and forests. The day concluded with an informative field trip in the Mill Creek drainage (in Oregon). Participants came from multiple states, but all had vested interest in fuels reduction and forest management in the northern section of the Blue Mountains.

Many thanks to Mark Klicker for hosting us at his property and sharing his land management experiences, and to the experts from Oregon Department of Forestry, Washington Department of Natural Resources, USDA Natural Resources Conservation Service, Washington State University Extension Service, Wallowa Resources, and American Forest Foundation for contributing to the program's success. We'll be following up with participants to connect them to sources of technical, educational, and financial assistance, with the ultimate objective of getting additional fuels reduction and forest restoration activities completed in this target landscape.



Biomass Supply

Emerging technologies & enabling conditions

PART 3 OF 4

Adapted for this newsletter by Nicole Strong, from an original article by Vernita Ediger, Central Oregon Intergovernmental Council and the Central Oregon Forest Stewardship Foundation

ABOUT THE BIOMASS SUMMIT

On October 19, 2018, the Ochoco Forest Restoration Collaborative (OFRC) hosted a Biomass Summit in Prineville, OR. Gathering together 16 speakers from all over the western states, the Summit featured four panels with different focus areas: Success Stories and Lessons Learned, Supply and Scale, Emerging Technologies, and Policy and Financial Incentives. This series of blog posts offers a synopsis of the rich content generated from each panel. You can find more information about each of the panels at <http://ochocoforest.org/biomass-summit/>.



A wide range of technologies and approaches exist for creating value from small-diameter woody material. Each of these has pros and cons that make them more or less viable in certain locations and contexts. Panel 3 explored three different approaches and technologies to utilize biomass, and asked the questions: How does one decide which approach to utilizing biomass makes the most sense? What enabling conditions support success in a particular location?

WESTERN JUNIPER UTILIZATION

Historic and current-day landscape photos highlight the extent of juniper proliferation and expansion across much of Central and Eastern Oregon. According to Dylan

Kruse (Sustainable Northwest), western juniper (*Juniperus occidentalis*) has expanded far beyond its historic range, displacing native shrubs and grasses and creating myriad ecological imbalances. While the impact on forage and water availability is significant, juniper's proliferation has also created an opportunity to link current rangeland restoration efforts with a market for juniper.

The Western Juniper Alliance (WJA) (formerly the Western Juniper Utilization Group) was created to do just that, and seeks to transform the ecological challenge of juniper expansion into an economic opportunity by creating markets for the invasive western juniper and shoring up the supply chain. WJA is involved through the entire process from juniper felling and decking, hauling, and milling, all the way through to developing commercial products such as decking and siding, and utilizing juniper in landscaping and home interiors. The hope is that by 2020 the western juniper industry will have a self-sustaining supply. At the same time, this market opportunity will accelerate the pace and scale of rangeland restoration as more commercially viable juniper is captured by the market.

Dylan highlighted that the economic margin on juniper markets is very small. Thus, in order to be profitable, the WJA relies on rangeland owners viewing the removal of juniper as a service rather than an opportunity to make money themselves. Essentially, the rangeland owner benefits by having juniper removed from a property and

the entrepreneur benefits from access to a supply of juniper. The entrepreneur isn't charged for the wood, but is allowed to cut, deck, haul, mill, and market it to make a profit. In return, juniper is removed from rangeland, increasing forage production and water retention.

TORREFACTION

Other biomass utilization efforts require more up-front investments in infrastructure. Matt Krumenauer of Oregon Torrefaction described the thermo-chemical process by which biomass is subjected to intense heat (200-300 degrees C) in a low oxygen environment and converted from woody material into a high-grade, light-weight biofuel that burns cleaner than coal. Because torrefaction facilities are very expensive—with the plant slated for construction in John Day estimated to cost \$31 million dollars—they are cost-prohibitive in most circumstances. In fact, Oregon Torrefaction has been successful largely because of funding available from the US Endowment for Forestry and Communities, among other sources.



That said, once sited, it is estimated that the facility slated for construction in John Day, OR will create 13-17 new jobs in Grant County. The total economic impact could be 39 jobs and \$6.8 million per year, including plant employment, business purchases, and induced impacts through employee purchases, according to a report from the Oregon Employment Department.

Crook County won't benefit directly from the torrefaction plant, but forest restoration projects on the Ochoco National Forest may still benefit by shipping biomass over the hill to John Day and thus reducing haul distances for biomass processing.

BIOCHAR

Rather than burning slash piles after a thinning project, Darren McAvoy of Utah State University Extension suggests cooking the woody debris in one of his mobile pyrolysis or gasification units. Applying high-heat in the absence of oxygen—a process called pyrolysis—creates biochar, a charcoal that can be used to augment soil fertility and has broad applications in agriculture. This practice reduces fuel loads in the forest by transforming slash piles into a useful product. Additionally, since biochar is mixed in with soil, biochar production and utilization captures and stores carbon rather than releasing it into the atmosphere through pile burning, creating a net negative carbon balance.

Darren drives his mobile biochar unit into the forest, loads it with biomass “waste” left over from forest restoration projects, and then processes it by cooking in the absence of oxygen. The resulting biochar is a carbon-rich, stable solid. Bio-oil, also produced through this process, can be refined further into higher-value petrochemical products.

Daren's mobile unit reduces the costs of hauling biomass since the processing facility is transported to the forest rather than the other way around. The raw woody debris is treated in the forest and transformed into a lower weight and lower volume product. The result is that fewer trips out of the woods are required and each trip hauls a higher value product.

In addition to the expensive mobile pyrolysis and gasification units, McAvoy has designed a method of creating biochar in a simple kiln or metal box. Such small-scale production units make biochar scalable. Anyone handy enough to build a simple kiln can get into the business. The current challenge is a need to build market demand and shore up the supply chain.

CROSS LAMINATED TIMBER

Ethan Martin of WoodWorks focused his presentation on Cross Laminated Timber (CLT), also known as Mass Timber, a building product that can be made from small diameter wood and used in the construction of tall buildings. CLT is made from layers of lumber boards stacked crosswise at 90-degree angles and glued into place. This product design generates incredible strength, as evidenced by its use in an 85 foot high rise in Portland, Oregon.

CLT panels can be used in floors, walls, and roofing. It is

cost effective compared to other wood products and can be used in hybrid applications with concrete and steel. Additionally, it can also speed construction times when it is used as a prefabricated building component.

PANEL SUMMARY

Key themes that emerged in this panel include: the importance of considering the regional context in which the technology will be deployed, up-front costs of investment in infrastructure, and the importance of supply chain and market development.

Like many biomass utilization options, torrefaction requires a hefty up-front investment in infrastructure. Without a subsidy or grant, this kind of biomass project is typically not economically feasible.



Once a plant of this kind is located in Eastern Oregon, it will have an impact on biomass supply, since it is likely to draw biomass from surrounding forests, including the Ochoco National Forest. While this may be beneficial to forest restoration projects on the Ochoco National Forest, it also influences the context in which Crook County biomass entrepreneurs are operating.

Supply chain and market development are foundational to the success of any product, whether it is CLT, biochar, or juniper decking material. CLT is an exciting opportunity for biomass in part because it is developing a niche market within the building and construction industry. Processing facilities are already in place and the Think Wood movement is encouraging CLT as a replacement for steel and concrete. It's ready to go with a little extra market development. In contrast, the supply chain for western juniper is challenged since it requires working with multiple landowners to access commercially viable wood. On top of that there is a

need to cut, haul, and deck the wood so it can then be picked up and transported to a mill. Connecting all the links in the supply chain takes thoughtful planning. The lack of a solid market for biochar is one of its current weaknesses. Although a supply of woody debris is ready-to-hand, a steady market for this soil additive has yet to be developed, making it a less viable option at present. In each of these examples, the supply chain and market demand impact the associated economic opportunity for the product.

This panel highlights that there are many emerging technologies for capturing value from biomass. Identifying which ones offer the best opportunities for Crook County requires a thoughtful analysis of availability and consistency of supply, sources of market demand, and regional competition.

KEY TAKEAWAYS

- Developing niche markets, such as the CLT market, offers an opportunity to leverage existing market demand. Rather than developing a new market, the opportunity is to carve out a niche within an existing market and take advantage of the existing demand.
- Product profitability hinges not only on supply but also on a consistent market demand for that product—so shoring up the supply chain and increasing market demand is important for long-term success.
- Many biomass utilization technologies require a significant up-front investment in infrastructure. Entrepreneurs should explore available programs such as those offered by the US Endowment for Forestry and Communities to support infrastructure development.
- Regional context matters. Once a biomass utilization facility is located in a particular area, market forces in that region shift as a result of competition for regionally available supply. How can Crook County best take advantage of the proximity of the John Day torrefaction plant?

LOOKING FOR MORE INFO ON BIOMASS IN CENTRAL OREGON?

Visit <http://ochocoforest.org/biomass-summit> for additional articles and summaries from the OFRC Biomass Summit.

BAKER COUNTY NEWS

Jacob Putney, Extension Forester in Baker County

Hello! My name is Jacob Putney and I am the new Extension Forester in Baker County, succeeding Bob Parker. I was born and raised in Canby, Oregon before starting at Oregon State University, where I completed my bachelor's and master's degrees in Forest Management and gained experience working on OSU's Research Forest. I am looking forward to becoming proficient in the forest types of Northeastern Oregon, as well as meeting and working with the area's woodland owners. My background includes forest inventory, silviculture, forest health, and forest modeling. I am excited to be here! In my free time I love to hike, backpack, and fish.

I can be reached at the Baker County Extension Office in Baker City:

Phone: (541) 523-6418

Email: jacob.putney@oregonstate.edu



BAKER RESOURCES COALITION

In the summer of 2018, a roundtable discussion was held on five themes: working together to sustain water resources; benefitting from tourism and recreation opportunities; building and expanding forest product markets; challenges and opportunities in the wildland urban interface (WUI); and cultivating the next generation of stewardship leaders. This discussion brought together a wide spectrum of natural resource managers, community leaders and government representatives from county, state and national levels. The Roundtable concluded with the formation of the Baker Resources Coalition (BRC).

The Coalition is a partnership of individuals and institutions from different sectors who are committed to: Promote Baker County's natural resources as a cornerstone for economic development and the wellbeing of our citizens; and to provide a forum for people from different sectors to work together to address natural resource management issues. In addressing this mission, the BRC has identified five goals: investing in our future; promoting Firewise communities; promoting woodland stewardship; supporting watershed management; and enhancing recreation and tourism.

Toward this effort, BRC launched a summer internship program in 2019 for high school students in partnership with the Baker Technical Institute (BTI), Baker 5J School District, and private landowners/resource managers. Interns had the opportunity to work on a series of projects including: stream restoration, fuels reduction, construction of aspen enclosures, forest stand analysis and inventory, supporting nature hikes and aquatic insect assessments, and developing an interpretation of the natural, geological and cultural history of a popular hiking trail. To continue these opportunities, this fall BRC is hosting two "Friday Natural Resource Management Excursions," which are designed to engage students in the different aspects of woodland management.

With many more ideas, and no shortage of challenging issues to address, the Baker Resources Coalition will continue to promote lasting decisions and to provide different avenues to help connect citizens to their surrounding natural resources. More projects are on the horizon, so stay tuned for more developments!



High school students learning about ecology and management in the Elkhorn Mountains.

Tree-of-heaven: A not-so-heavenly invader

By John Punches, Extension Forester in Union, Umatilla, and Wallowa Counties

The Pacific Northwest is under invasion by aliens. I'm not talking about little green men from Mars, but rather little green trees from Asia. The invader goes by the rather misleading name tree-of-heaven. Misleading because this species has little interest in peace and harmony – it's an aggressive invader that rapidly overwhelms native habitats, displacing native plants and the fauna dependent upon them.

Tree-of-heaven (*Ailanthus altissima*) is believed to be native to central China and Taiwan, but it's been introduced throughout Asia. It was carried to the

United States as early as 1784, where it appeared in Pennsylvania as an ornamental. It was introduced again in New York in 1820, and was a common nursery tree in the eastern U.S. by 1840. It made its way to California during the Gold Rush of the mid-1800s.

While still most common in those early introduction centers, tree-of-heaven has become invasive throughout most of the U.S. Here in the PNW it's become particularly common along the banks of the Columbia and Snake Rivers, but I've personally observed it in (and radiating out from) nearly every town or city I've visited in Oregon and Washington. All too often it has become the dominant urban tree, not through intentional planting but because it so readily sprouts and spreads. While it's not yet gained a strong foothold in our timberlands, it has the potential to do so. This is an invader you do not want to let become established on your forestland.

More information on the tree-of-heaven's characteristics and growth habits can be found at: <https://www.fs.fed.us/database/feis/plants/tree/ailalt/all.html>.



Tree-of-heaven has become endemic in the eastern Columbia River Gorge.

KNOW YOUR ENEMY

Tree-of-heaven is a fast-growing, deciduous species that often occurs in clumps or in rows along roads, streams, or fences. Mature trees can reach heights of 70 feet and can have crowns as much as 80 feet in diameter. One individual is known to have a stem 20 feet in diameter, but more commonly it occurs in dense thickets of small diameter stems. Its leaves are pinnately compound (like a walnut leaf), and impressive in size – one to four feet in length with 10 to 40 leaflets. Each leaflet is smooth along its edges (“entire” in botanical speak). Its bark is light grey and relatively smooth, but can take on a diamond pattern as stems increase in size.

Tree-of-heaven reproduces both by seed, and by cloning itself. It produces prodigious numbers of light, winged seeds (300,000 per year is common, and as many as 2 million seeds have been recorded on a single tree). It produces horizontal roots that will develop new stems if they reach the soil surface. If stems are cut, they rapidly produce stump sprouts (over 17,000 per acre on one study).

Study results are mixed on its range of tolerances. The tree is often rated as intolerant of shade, but it’s found persisting in closed canopy forests. It has been rated as both tolerant and intolerant of flooding. What’s known for certain is that it aggressively invades riparian areas, and disturbed areas such as those associated with insect defoliation, windthrow, or construction activities. Once established it spreads rapidly and maintains its hold by emitting chemicals that inhibit the growth of other plant species.

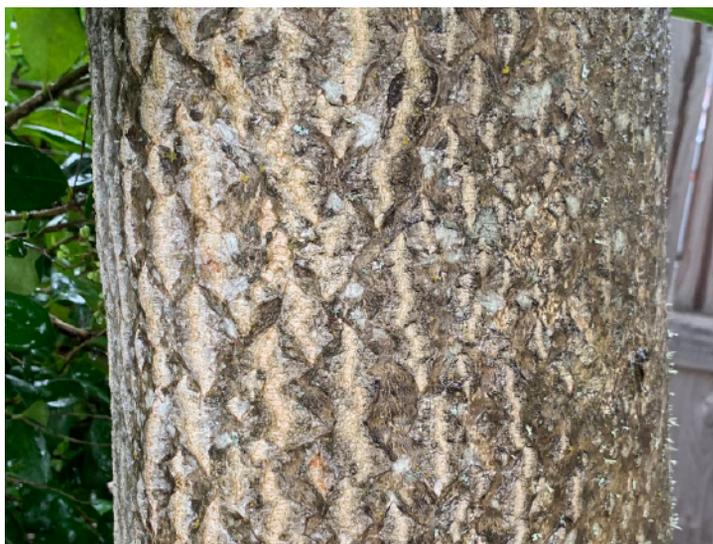
THE ART OF WAR

If you find tree-of-heaven on your property, what should you do? Take action quickly. Management of newly establish seedlings can be as simple as pulling them from the ground, roots and all. Once they become established, pulling is likely to leave a portion of the tree’s taproot behind, allowing it to resprout. Foliar application of herbicides can be somewhat effective in managing seedlings and saplings, although repeat treatments will likely be necessary.

For larger trees, a combination of cutting and herbicides is recommended. Chemical treatment of freshly cut tree-of-heaven stumps is an effective control method with proper chemical selection and timing of application. Frill treatments (AKA hack and squirt) are another



Tree-of-heaven is easy to spot, with its large, pinnately compound leaves and prodigious seed production.



Diamond-like appearance of the bark.



Tree-of-heaven is generally dioecious, meaning some trees are female and others are male. This female tree is loaded with light, winged seeds.

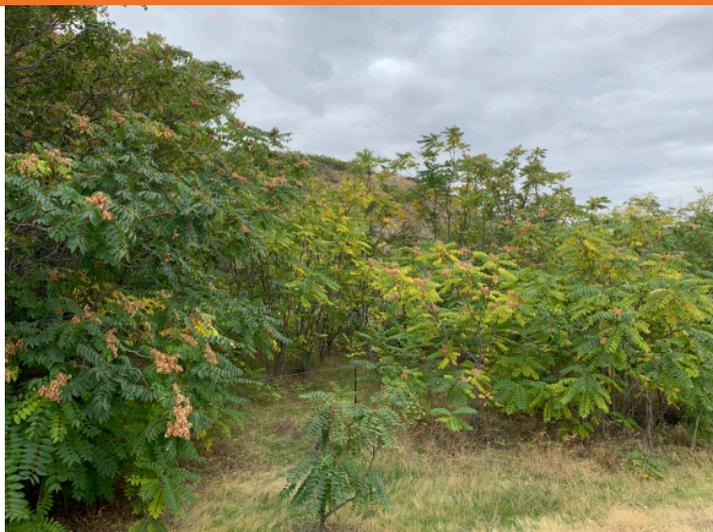
viable option –incisions are made in the tree’s bark and concentrated herbicide immediately sprayed in the cut area. Note that cutting alone does little to control tree-of-heaven and may actually be counterproductive due to rapid resprouting. For a good overview of chemical options and their most effective timing, see the Penn State Extension publication: <https://extension.psu.edu/tree-of-heaven>.

Caution should be exercised in chemically treating tree-of-heaven if close to other high value trees. Tree-of-heaven roots have been observed to exude herbicide after treatment, and herbicides may also be transferred to other species through root contact or potentially through shared mycorrhizae fungi. In one study in southeastern Ohio, native hardwoods were often killed by herbicide transfer if within 10 feet of the target tree-of-heaven (this particular study was on the effect of the herbicide imazapyr, which is known to be highly translocated and very effective in control of hardwood species). Choose your chemicals carefully and consider the possibility of transfer to neighboring trees.

Can tree-of-heaven be managed with prescribed fire? Perhaps, but not easily. Tree-of-heaven is very effective at photosynthesis and quickly develops ample carbohydrate reserves in its roots. This is what makes it so capable of re-sprouting after being cut, and it is likely that while a broadcast burn could kill tree-of-heaven’s stems and other above-ground features, the roots would remain viable. Following fire it’s likely that the species would re-sprout aggressively. Thus, control of tree-of-heaven would require repeated burning at a frequency sufficient to deplete the trees’ energy reserves.

A PARTING WARNING

Tree-of-heaven can have negative impacts on your health. It produces a lot of pollen and is a source of allergies for some individuals. Direct contact with any part of the plant may cause skin reactions for some people, and there are rare reports of heart muscle inflammation from exposure to sap through broken skin or other wounds. Wearing gloves and protective clothing is a wise precaution if you’ll be handling any part of the tree.



Typical pattern of spread includes prolific seeding and cloning through root sprouts.



In city settings, this invader causes lots of damage. Note the lifted concrete driveway.



Parking lot median rapidly invaded by tree-of-heaven. Asphalt damage will ensue as roots spread.

KLAMATH BASIN NEWS

Daniel Leavell, Extension Forester in Klamath @ Lake Counties

CHANGE – THE SECOND GREAT CONSTANT

As long as there is a sun in the sky, an atmosphere around this planet, and carbon-based lifeforms – there will be fire. Fire is neither evil nor saintly, it is only a force of nature – a chemical reaction that can be detrimental or beneficial to lifeforms – humans in particular. Fire is the first Great Constant. The second great constant is Change. All things change – the only thing that can be counted on is that nothing can be counted on and that all things will change – the eternal constant.

My life and work is also subject to this change. Over the past couple of years I have been working with my College of Forestry Extension colleagues (throughout the State and on campus) to create the first Extension Fire Program at OSU – within the College of Forestry Extension program. We all have been recognizing the need – especially with the last five years being the hottest years on record (since mid-1800 when records began). The 36 Pit Fire, Eagle Creek Fire, and the many, many acres burned within so many fires since then. The repeated tragedies in California have only reinforced the urgency to deal with the calamities facing us. Where we used to be alarmed and disappointed when one or two homes were lost on a wildfire – now we are losing thousands. Where we used to be alarmed and geared up when red flag conditions occurred – now we are dealing with “extreme” red flag conditions.

Oregon State University Extension (established in 1911) has an organizational infrastructure in collaboration with the counties across the state. This collaborative arrangement is a tested and trusted vehicle to reach all of our communities (rural and urban) with the latest education, experience, and training from OSU. The Extension Fire Program Initiative we proposed to the State Legislature this past session put three pieces together to operate within the infrastructure to do something about the fire risk facing us all. The Initiative we proposed will: 1. Educate all segments of Oregon to fire science concepts to create an understanding of how fire behaves, what to do, how to do it – all to mitigate and reduce risk and hazard; 2. Map out areas across the state to emphasize fire risk and priority for values at risk; and 3. Build partnerships to initiate and to assist ongoing efforts at cross-boundary, landscape-scale and science-

based management, following the proofs of concept the Klamath Lake Forest Health Partnership has developed for Klamath and Lake Counties. We proposed hiring eight permanent, full-time positions to carry this through into the future: a Statewide Fire Specialist, a Statewide Fire Program Manager, and six, Fire Specialists to work in the communities where our mapping effort indicates the highest need and priority.

We were funded this last session – to which I am very grateful. The Legislature agreed that this Initiative will benefit the ecosystems, communities, and economies of the state by combining our Forest and Natural Resources Extension with a strong Fire Extension component – in the communities with the resources of the University backing our efforts. But it will be the partnerships we have made and will make throughout the state that ensure success.

It will be my job from now until the end of next June to assist in developing this program with my colleagues on campus. Though still keeping in touch with Klamath and Lake County (25%), most of my time will be in Corvallis (75%). No problem, however, because I will be replaced by two highly energetic and capable professionals: Kasey Johnson (now working with ODF) and Kendal Martel (with the Forest Stewards Guild). Kasey will provide Extension forest and natural resource expertise and assistance and Kendal will provide fire science and partnership expertise and assistance. They will be supported by my esteemed and honored College of Forestry colleagues and by my valued professional partners within the Klamath Lake Forest Health Partnership (KLFHP). Klamath and Lake County are in extremely good hands.

It has been a great honor and privilege to spend valuable time with such salt-of-the-earth land managers, land owners, and Extension experts/assistants within the KLFHP and within my home base at the Klamath Basin Research and Experiment Station. All of these folks are accomplishing what others can only dream – all to benefit the ecosystems, communities, and economy of our area. Getting to know the many fine folks in Klamath and Lake while enjoying the natural beauty and innumerable opportunities for recreation in the two Counties has and will be a special thing for me. Special thanks to all.



Oregon State University

Extension Service

10507 N. McAlister, Room 9

La Grande OR 97850

541-963-1010

ARE YOU READY FOR WINTER?

Get your forest roads ready for wet weather

- Check road surfaces for signs of erosion – repair where feasible
- Inspect and repair water bars – add additional ones if needed
- Check culverts – ensure they are free of debris and not washing out

Burn slash piles

- Contact Oregon Department of Forestry to identify a good burn day
- Make sure you file notification and obtain your burn permit

Winterize your equipment

- Drain fuel from equipment you won't be using over the winter
- Drain water from pumps or coolant systems, or add appropriate antifreeze
- Consider covering equipment that will remain outside over winter

Get your vehicle ready

- Check coolant to ensure it will resist freezing
- Put on your winter tires
- Ensure you have chains, tow strap, shovel, gloves, rain gear, road flares, high visibility vest
- Practice putting the chains on your tires – particularly if you have changed tire size
- Consider carrying a winter survival kit with warm clothes, sleeping bag, water, snacks
- Check your windshield wipers and replace if needed

Mitigate your home fire hazards

- Clean your chimney
- Check your fire extinguishers
- Replace batteries in your fire alarms and carbon monoxide detectors

