Utah Forest News

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Aspen Seedlings and Western Forest Regeneration

State of Aspen in the Intermountain West

Quaking aspen has the most extensive range of any tree species in North America. It extends from Newfoundland to Alaska and south to Mexico. Aspen is an important provider of forage for a variety of wildlife species; it is associated with high levels of plant and wildlife biodiversity, is highly valued by the public for its aesthetic appeal, and can be an important firebreak species.

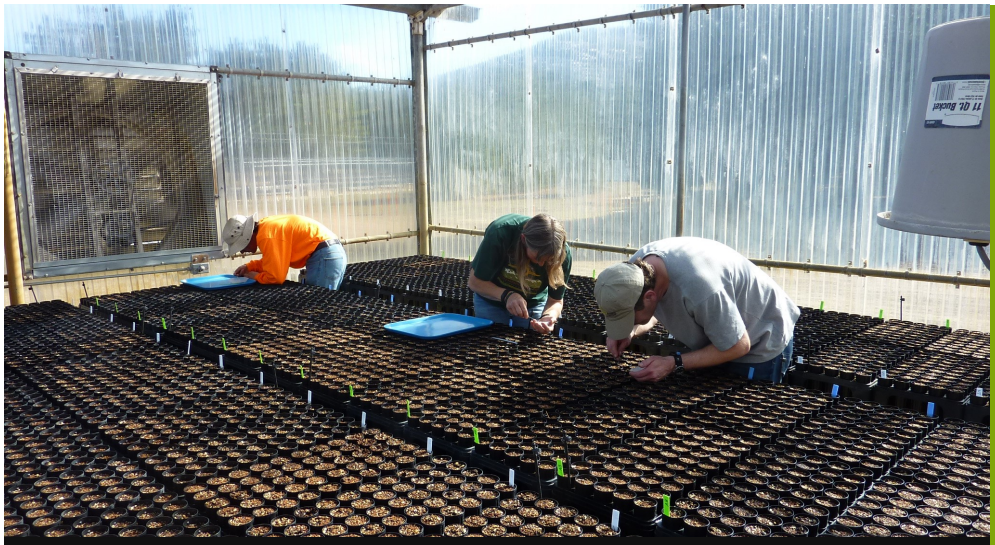
Aspen has been on a decline in parts of the West over the latter half of the 20th century. This decline has been attributed to fire suppression (which leads to a cycle that excludes aspen) and 'dieback' (thought to be caused primarily by drought). Climate change projections indicate that aspen may be lost from much of its current range in the Intermountain West within a century, so effective regeneration of the species is essential.

Aspen Regeneration

Because aspen typically reproduces via suckering, or asexual reproduction, rather than from seed, aspen regeneration has been primarily focused on coppicing mature stands to encourage suckering. However, recent discoveries have shown that (*cont. page 5)*

"The hope is that these highly diverse seedling plots will establish, spread through suckering, and grow tall enough to avoid herbivores within a few years."

- Dr. Karen Mock, Geneticist, Utah State University



Two Harrington greenhouse employees and Simon Landhausser (University of Alberta) work to germinate aspen seeds at the Harrington Forestry Research Greenhouse in Mora, New Mexico. Photo courtesy Dr. Karen Mock.

In This Issue

Lettuce seeds and milled biochar from Utah-grown cherry wood. Photo courtesy Britney Hunter.

Thinking Big About Biochar in Utah

Davis County Extension Agent Britney Hunter is making strides toward understanding if biochar can enhance agriculture practices in Utah. Big claims have been made about the ability of this charcoal-type product to boost agricultural yields and mitigate the negative impacts of climate change.

Sales of biochar have tripled annually since 2008, according to some estimates (Nature 2015). As an expert in the field of horticulture and vegetable production in Utah, Hunter's interest was piqued. Hunter has worked for Utah State University Extension for the last 4 years. She has made it a top priority to inform everyday Utahns of scientific discoveries in her area of expertise that might enhance their lives.

What is Biochar?

Biochar is a porous, charcoal-like product that is the result of pyrolysis (cooking) of materials containing carbon such as wood, crop residues, solid waste, livestock manure, and other organic material in the absence of oxygen. Biochar is extremely stable and is very slow to decompose. This unique quality has garnered the attention of global climate experts. Because of biochar's ability to preserve carbon in solid form rather than letting it be decomposed to carbon dioxide, scientists believe biochar may be a long-term repository for storing carbon. As a soil amendment, biochar has shown promise for increasing plant resistance to drought, decreasing soil compaction, increasing soil microbial activity, and decreasing the need for fertilizers.

Biochar as a Soil Amendment?

Hunter and her collaborators are interested in determining how biochar could benefit the growth and production of tomatoes and melons in Utah when added as a soil amendment. They are testing biochar made from Utah-grown cherry wood. The biochar used in the experiment was created by Western Renewable Technologies (Lindon, Utah). Results are expected during 2016 and will be reported in future editions of Utah Forest News. Stay tuned!

Cernansky, Rachel. State-of-the-Art-Soil. Nature Vol 515. January 2015.

Biochar as a Tool for Land Reclamation in the Uinta Basin

Research Scientist Chris Peltz and USU Forestry Extension Associate Darren McAvoy are interested in using biochar as a tool for land reclamation in the Uinta Basin.

Why the Uinta Basin?

The Uinta Basin has many abandoned oil and gas pads. For a number of reasons including soil compaction, presence of invasive species, and soil salinity, abandoned oil and gas pads can be challenging to restore. Biochar has shown promise as an effective soil amendment, especially in areas with compacted and dry soils.

The objective of this study is to determine how the application of biochar on oil and gas pads impacts the likelihood of effective restoration at these sites. This study will determine how biochar impacts germination rates, plant cover, and a variety of soil qualities including soil compaction, aeration and microbial activity.

Results are expected in late 2015 and will be reported in future editions of Utah Forest News. Stay tuned!

Mixing biochar with manure.

What is Cross Laminated Timber?

What is Cross Laminated Timber? CLT is an engineered wood product that is constructed by joining small pieces of wood using glue or hardware.

The large walls that can be built with CLT technology are both versatile and attractive and have excellent insulating qualities and provide significant thermal mass.

Interlocking Cross Laminated Timber Frame, Photo courtesy Euclid Timber Frames.

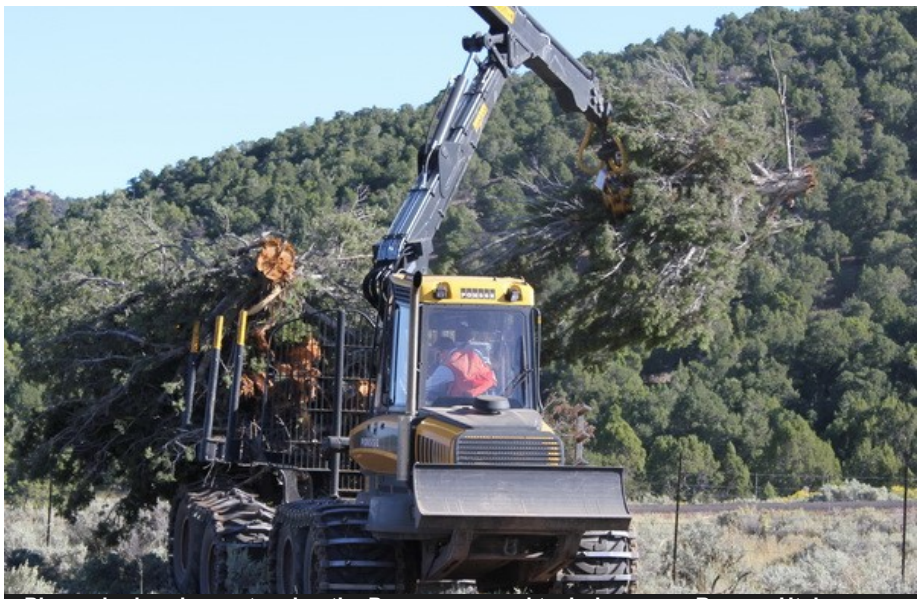
Forest Service Grant Awarded

The Utah Biomass Resources Group (UBRG) was recently awarded a USDA Forest Service Wood Innovations Grant totaling more than $164,000. Grant partners include USU Extension, the USU Botanical Center, and Euclid Timber Frames.

Cross Laminated Timber is an engineered wood product that utilizes low value small boards joined together into 'Massive Wood Walls' (See UFN Winter 2013). The overall goal of this grant is to expand markets for low-value wood by increasing awareness of CLT building technology. With a building design in-hand, team members will approach private donors to fund the building of the CLT structure. This innovative building will be used as an educational facility at the Utah State University Botanical Center in Kaysville. The building will be a multipurpose structure that will serve as a greenhouse and teaching facility and will include a demonstration kitchen.

This will allow USU Extension staff and others to conduct farm-to-fork type trainings at the Center as well as other public functions. In addition, the UBRG with local producer of CLT frame structures Euclid Timber Frames L.C. (Charleston, Utah), will conduct a public outreach campaign directed at growing the market for CLT in Utah. This grant will allow the UBRG to develop the industry for utilizing previously unused, low-value waste wood from National Forest lands, such as beetle-killed pine.

Creating value for waste wood can lead to reduced wildland fire risk, new industry, more jobs, and improved forest health in Utah.



Pinyon-juniper harvest using the Ponsse removal technique near Beaver, Utah, Photo courtesy USFS.

Monitoring the Effects of PJ Harvest and Utilization

Sagebrush steppe communities are quickly decreasing in the Intermountain West. This decrease has allowed pinyon pine and juniper (PJ) to increase into areas formerly unoccupied by these species. Pinyon-juniper expansion has many negative ecological implications including a decrease in vegetative cover, a decrease in water availability to other species, and an increased vulnerability to erosion.

Harnessing the Benefits of PJ Harvest

The detrimental impacts that have resulted from the expansion of PJ were the catalysts that caused USU researchers Kari E. Veblen, Helga Van Miegroet and Ron Ryel to investigate the ecological impacts of different mechanical removal methods for PJ. The objective of this project was to compare ecological effects of two PJ removal methods: mulch & bale (Biobaler) and forward & mastication (Ponsse), and to determine if these removal methods resulted in restoration.

They tested these two methods on the Nevershine Hollow PJ stewardship contract near Beaver, Utah in 2011. Currently there is a push to find the most cost-effective method for removing and processing PJ – especially for biomass utilization. Study results suggest that in the case of the biobaler, targeted removal of medium-sized juniper at mid-elevation sites will yield the greatest increase in cool and warm seasons grass cover.

Removal Methods Impacts Findings

At both the Ponsse and biobaler sites, disturbance was high. Of particular interest was the increase in herbaceous cover and dead shrub cover at the medium PJ density sites. These findings suggest that targeting medium PJ density stands for removal (with either technique) may yield the greatest increase in cool and warm season grass cover. In addition, invasives increased at all sites, *except* at mid-elevation, medium PJ density biobaler sites. For this reason, caution should be used when prescribing treatments so as to not inadvertently increase the prevalence of invasives. Erosion was not impacted by either removal treatment. The full report can be read here.

Utah Preferred Tree Lists are HERE!

This fall the Utah Community Forest Council unveiled a new publication that guides Utahns interested in planting the trees best suited to their location.

The Utah Community Forest Council along with Urban Forestry Coordinator Meridith Perkins, Utah Community Forestry President Jeran Farley, consulting arborist Jason Barto and arborist for the city of Herriman, Ty Nielsen, collaborated on this useful guide for the citizens of Utah.

View their recommendations for the best trees to plant in northern and southern Utah, and on sites at high elevations.

UTAH PREFERRED TREE LIST NORTHERN REGION

UTAH PREFERRED TREE LIST SOUTHERN REGION

UTAH PREFERRED TREE LIST HIGH ALTITUDES

***Prunus virginiana* (chokecherry), Photo courtesy of USDA.**

SAVE THE DATE

Restoring the West Conference 2015:

Oct. 28-29, 2015

"Restoration and Fire in the Interior West"

Join us in beautiful Logan, Utah at the Eccles Conference Center on the campus of Utah State University for the 10th Annual Restoring the West Conference. This year's theme will bring a diverse group of speakers that will discuss the role of fire as a tool for restoration and conservation in the Intermountain West. Please join us for this conference!

www.restoringthewest.org

This conference is organized and sponsored by Utah State University (Cooperative Extension, Wildland Resources Department, Quinney College of Natural Resources, and Ecology Center), USDA Forest Service, State and Private Forestry and the Western Aspen Alliance.

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Aspen seedlings in the Harrington Forestry Research Greenhouse.

(*cont. from page 1*) seed reproduction plays a more important role in aspen regeneration than previously thought. This can mean good things for aspen – the more pathways aspen have for regenerating, the more likely that this important species will persist. Regeneration by planting seedlings can also be used to establish aspen in areas where it has been lost or does not currently exist; an impossibility with strictly coppicing.

Increasing Aspen Resilience

Although regeneration of new trees via suckering is far more common, regeneration via seedlings (i.e. through sexual reproduction) is disproportionately important because it can establish new, genetically distinct clones. The more clones that are present, the better the chances that natural selection can help the species adapt to future shifts in climate. In western landscapes, because aspen clones are often quite large, genetic diversity can be very low compared to other forest trees. To increase genetic diversity, land managers could monitor, identify, and protect areas where natural seedling regeneration events occur (e.g. following fires). Another management approach would be planting aspen seedlings in areas where aspen already exist, or could exist, thereby increasing genetic diversity and resilience. A problem with the planting approach is that we currently lack the research to know where to collect seeds, how to grow them, and the best way to plant them efficiently in western U.S. landscapes.

Learning to Regenerate Aspen with Seedlings

In the fall 2015, Karen Mock (Utah State University Geneticist) partnered with Simon Landhäusser (University of Alberta) and Owen Burney (New Mexico State University) to initiate a seedling-based restoration project in southern Utah. Dr. Landhäusser has been successfully growing and planting aspen seedlings in mined land reclamation projects in Alberta, CAN, and Dr. Burney is the director of the John T. Harrington Forestry Research Center, where the seedlings for the Utah project are currently being grown. Seedlings are being grown in a way that maximizes their root resources at planting. The seedlings will be planted at three sites on Cedar Mountain, Utah within small exclosures designed to protect them from herbivory by deer, elk, cattle, and sheep. The hope is that these highly diverse seedling plots will establish, spread through suckering, and grow tall enough to avoid herbivores within a few years, when fencing can be removed and used to establish new plots. Researchers have already grown 18,000 healthy seedlings (with nearly 100% germination rates) in the greenhouse (see photo). Tree seedlings will be planted in October 2015 with help from Cedar Mountain landowners, USU graduate student Alex Howe, Dr. Randall Violett (Southern Utah University) and students from the SUU Range Club. The work is being sponsored by the Cedar Mountain Initiative through USU Extension. These investigators hope that this project will become a successful demonstration of how aspen seedlings can be used in western forest restoration work.

Join Us! 14th Annual Timber Harvest Tour & Mobile Pyrolysis Demonstration: Aug. 13, 2015

Join USU Forestry Extension, the Utah Division of Forestry, Fire and State Lands, Amaron Energy, Range Valley Ranch, the Utah Biomass Resources Group and the Intermountain Society of American Foresters. for the 14th Annual Timber Harvest Tour south of Price, Utah.

Participants will have the opportunity to observe an aspen removal/ regeneration treatment done for wildlife habitat on private land that was featured in the Summer 2013 issue of the Utah Forest News.

A special feature of this tour is a demonstration of mobile pyrolysis by Amaron Energy and the Utah Biomass Resources Group. Mobile pyrolysis is a potential alternative to traditional slash and burn disposal. Pyrolysis cooks the wood and thermally decomposes it into biogas, bio-oil, and biochar.

Stay tuned to the USU Forestry Extension website for details on how to register, etc.

http://forestry.usu.edu/

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Contact Us

Do you have a story idea for the next edition of Utah Forest News? Have feedback about any story in this issue? Send us an email or give us a call!

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