Life on the Dry Side
Life on the Dry Side
OSU FORESTRY & NATURAL RESOURCES NEWSLETTER
Serving land managers and owners east of the Cascades

Cover Story
8 Pine Butterfly Outbreak
Tree mortality

Features
3 Down on the Tree Farm
A monthly to-do list
4 Smoke and Prescribed Fire
Clearing the air
10 Fire on your Land
What and who you need to know
12 Reliable Forest Inventory
New online tools
16 Letters to Treeman

Local News Updates
6 Klamath Basin
7 Central Oregon
14 NE Oregon
15 Baker & Grant Counties

On the Cover:
The pine butterfly can be a serious defoliator of ponderosa pine. Read more on page 8.
Photo Credit: USDA Forest Service
**Down on the Tree Farm**

*Bob Parker, Extension Forester, Baker/Grant Counties. Content courtesy of the Northwest Woodlands Publication.*

<table>
<thead>
<tr>
<th>November</th>
<th>December</th>
<th>New Year’s Resolutions</th>
<th>January</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspect Roads</strong>&lt;br&gt;• Check that culverts are open and free of debris&lt;br&gt;• Clean existing water bars&lt;br&gt;• Ensure that waterbars are on roads in areas where you recently logged&lt;br&gt;• Seed bare ground with non-invasive grasses to stop erosion and weeds</td>
<td><strong>What to do after Christmas Dinner</strong>&lt;br&gt;• Nap&lt;br&gt;• Hold a family forestland meeting during the holidays when everyone comes over&lt;br&gt;• Share your vision for the forest with the children and grandchildren</td>
<td>• Renew your membership in your local woodlands association&lt;br&gt;• Attend your woodland association’s meetings, classes, tours and workshops&lt;br&gt;• Invite a friend to attend meetings with you!&lt;br&gt;• Promise to recruit one new member</td>
<td><strong>I Think I Can, I think I Can, I think I Can, I Think I Can…</strong>&lt;br&gt;<strong>Year-end Planning</strong>&lt;br&gt;• Talk with your accountant about any end-of-the-year tax concerns&lt;br&gt;• Update your will and your plans for passing down the tree farm</td>
</tr>
</tbody>
</table>

**Check Equipment**<br>• Winterize motors – antifreeze, tires, oil, etc.<br>• Drain your fire wagon and make sure to get water out of those pumps and hoses<br>• Store fire hand tools in a dry place<br>**Begin Thinning & Pruning Projects**<br>• Plan and perform pruning and thinning to meet your management goals<br>• Avoid damage to branch collars and “coat hanger” branch stubs<br>• The sap is down and there is less risk of damage from insects and disease when trees are dormant | **Check Equipment**<br>• Winterize motors – antifreeze, tires, oil, etc.<br>• Drain your fire wagon and make sure to get water out of those pumps and hoses<br>• Store fire hand tools in a dry place | **Begin Thinning & Pruning Projects**<br>• Plan and perform pruning and thinning to meet your management goals<br>• Avoid damage to branch collars and “coat hanger” branch stubs<br>• The sap is down and there is less risk of damage from insects and disease when trees are dormant | **I Think I Can, I think I Can, I think I Can, I Think I Can…**<br>**Logging**<br>• Wait for the ground to freeze and lessen compaction<br>• Reduce fuel and improve fireproofing of your forest | **Woody Woodpecker’s Inn**<br>• What is 16 inches in diameter, dead and 30 feet tall and is loved by Woody’s in-laws? A snag! Leave snags for wildlife when you can. Cut them when they are a hazard. | **I Think I Can, I think I Can, I think I Can, I Think I Can…**<br>**Logging**<br>• Wait for the ground to freeze and lessen compaction<br>• Reduce fuel and improve fireproofing of your forest | **Woody Woodpecker’s Inn**<br>• What is 16 inches in diameter, dead and 30 feet tall and is loved by Woody’s in-laws? A snag! Leave snags for wildlife when you can. Cut them when they are a hazard. |

**November**

- Inspect Roads
  - Check that culverts are open and free of debris
  - Clean existing water bars
  - Ensure that waterbars are on roads in areas where you recently logged
  - Seed bare ground with non-invasive grasses to stop erosion and weeds

**December**

- What to do after Christmas Dinner
  - Nap
  - Hold a family forestland meeting during the holidays when everyone comes over
  - Share your vision for the forest with the children and grandchildren

**New Year’s Resolutions**

- Renew your membership in your local woodlands association
- Attend your woodland association’s meetings, classes, tours and workshops
- Invite a friend to attend meetings with you!
- Promise to recruit one new member

**Another Year Already? Time is flying… I promise to:**

- Complete or update your written management plan
- Monitor nesting activity so you can protect or improve the habitat and avoid disturbing wildlife while they are sensitive
- Plan this year’s tree farm projects (aka a to-do list).
- Start recording changes on your property by taking photos and/or videos

**January**

- I Think I Can, I think I Can, I think I Can, I Think I Can…
- Logging
  - Wait for the ground to freeze and lessen compaction
  - Reduce fuel and improve fireproofing of your forest
- Woody Woodpecker’s Inn
  - What is 16 inches in diameter, dead and 30 feet tall and is loved by Woody’s in-laws? A snag! Leave snags for wildlife when you can. Cut them when they are a hazard.
By Daniel Leavell, Extension Forester in Klamath & Lake Counties.

Smoke filled my summers and my lungs for over thirty years. Not until retirement at 60 years old did I know clear air between April and October. For the eight years since then, I have gone out of my way to breathe in smoke from nearby vegetation fires. Wildfires, prescribed fires, burning slash piles – doesn’t matter. I miss it. My lungs have checked out to be clear for an old guy (in spite of an occasional cigar), even with thirty years of breathing wildfire smoke. Others are not as fortunate.

Wildfire smoke can aggravate respiratory health and cardiac problems. According to the Oregon Health Authority’s Wildfire Smoke and Your Health info-brochure (https://www.oregon.gov/oha/ph/Preparedness/Prepare/Documents/OHA%208626%20Wildfire%20FAQs-v6c.pdf), wildfire smoke is bad for your health because:

“Wildfire smoke is a mixture of gases and fine particles from burning trees and other plant material. The gases and fine particles can be dangerous if inhaled. In wildfires, carbon monoxide is mainly a risk to people (like firefighters) who work near smoldering areas. Smoke can irritate your eyes and your respiratory system, and worsen chronic heart and lung diseases. The amount and length of smoke exposure, as well as a person’s age and degree of susceptibility, play a role in determining if someone will experience smoke-related health problems.”

Since most wildfire smoke occurs during the hottest months of the year, closing windows and doors to seal out the offending smoke may have unintended consequences. The increased interior temperature can further aggravate health problems.

Wildfire smoke also has significant and negative economic impact on our communities. The Oregon Tourism Commission (Travel Oregon) released an impact paper on July 16, 2018 (http://industry.traveloregon.com/content/uploads/2018/07/TO-2017-Wildfires-Impact-Report-Final.pdf). During the 2017 fire season, 1.2 million acres burned in Oregon. Every County in the State had some level of fire activity. “Smoke from these fires was particularly widespread, causing 451 unique unhealthy air quality readings across the state, a 65% increase over the previous high number of readings between 2000 and 2016.” In terms of dollars and cents, “There was a $51.5 million loss in visitor spending attributable to Oregon wildfires in 2017. $16 million in earnings for employees and working proprietors was lost, as was $368,000 and $1.5 million in local and state tax receipts, respectively.”

How does smoke from a wildfire differ from that of a prescribed fire? Oregon State University’s “FIRE FAQ” series (https://catalog.extension.oregonstate.edu/em9203) provides an answer:

“Prescribed fires are regulated by states and are always subject to strict air-quality standards. Their use must be planned carefully to keep the smoke..."
they produce at acceptable levels. Managers can predict the direction of smoke plumes by relying on meteorological reports and using computer models. Managers avoid smoke-sensitive areas by burning under weather conditions that minimize smoke formation and problems. Occasionally, smoke from a prescribed fire may accumulate in a community, but any impacts are typically light and often last no more than a few hours."

Wildfires, however, burn under uncontrolled and unplanned circumstances, making it difficult to manage how much smoke is produced and where it goes. The primary factor in determining the generation of smoke is the amount of vegetation consumed. Vegetation consumption depends on the type of fuel (grass, trees, dead fuel such as woody debris, etc.), amount of dead fuel, fuel moisture content, size of fuel, topography, and duration of the fire, air temperature, relative humidity, and wind speed. Wildfires typically occur during the summer months, when fuels are drier and the likelihood of adverse weather conditions (high temperatures, low relative humidity, and sustained wind speeds) is greater.

Under these conditions, wildfires consume more vegetation on a per acre basis than prescribed fires, resulting in more smoke emissions. As smoke emissions increase, the concentration of particles in the air increases. In general, wildfires are far more likely to result in harmful air quality and public health impacts than prescribed fires because they are unplanned and typically are much larger. Wildfires also last longer, and burn and consume (on average) more vegetation per acre than prescribed fires.”

The State of Oregon has a Smoke Management Plan, governed by the Oregon Department of Forestry (ODF) and the Department of Environmental Quality (DEQ). Revised every five years, the last version was adopted in 2013. ODF and DEQ have taken the plan across the State to solicit input from community members to provide a basis for the latest revision. Most community input was in favor of altering the smoke management rules to give fire managers more flexibility to allow for more prescribed burning, while still protecting sensitive areas pre-designated across the State.

**Objectives of the revised plan include:**
- Prevent smoke from being carried to or accumulating in designated areas
- Maximize burning opportunities while minimizing emissions
- Coordinate with other state smoke management programs
- Conform with state & federal air quality and visibility requirements
- Protect public health
- Encourage the reduction of emissions

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**EYE-OPENER**


The Nature Conservancy planned a prescribed burn on a portion of their ownership on the Sycan. They own and manage about 30,000 acres there. Last year they put together a coalition of public and private fire agencies and researchers to not only conduct the burn, but to collect scientific data about the burn. This year they planned the same. The Desert Research Institute and University of Montana both had two drones with specialized monitoring attachments that are designed to collect smoke, particulates, toxicity, and innumerable other pertinent data on the prescribed burn. Ultimately, all data will go into modeling efforts – and research designed to answer questions like the difference between prescribed fires and wildland fires – and more. Very neat stuff.

They were scheduled to burn yesterday and today – and the rest of the week. About 40 fire fighters and managers – and the researchers – engines and tenders of various sizes and capacities. A big effort.

Both days were cancelled, as was the rest of the week. About 40 fire fighters and managers – and the researchers – engines and tenders of various sizes and capacities. A big effort.

This was an eye-opener to me.
NEW PUBLICATION

Project implementation

We are making progress on the two landscape projects in Lake and Klamath Counties. We have obtained some funding for project implementation within our Chiloquin Community Forest and Fire landscape project through the Natural Resources Conservation Service (NRCS) Conservation Implementation Strategy (CIS) grant and a Western States, State and Private grant administered by the Oregon Department of Forestry. These grants have enabled project implementation on properties within the Chiloquin area. We have also applied for Joint Chiefs, Oregon Watershed Enhancement Board (OWEB, and FEMA pre-disaster mitigation grants.


The new 57-page guide (plus resources and appendices) describes the process the Klamath-Lake Forest Partnership (KLFHP) was used to plan and implement cross-boundary restoration projects to achieve improved forest health conditions on large landscapes scales. It is intended as a model other individuals and communities can modify to meet the needs of their local circumstances. Many of the recommendations in the Guide are familiar to FFWG stakeholders including:

- “The concept of cross-boundary restoration needs to become institutionalized within each agency. Meaning, it becomes part of our official organization and common practice for each agency involved.”
- “The key agencies must seek out and support employees who work well in partnerships while representing their specific authorities to develop landscape cross-boundary projects.”
- “Use fire as a restoration tool at larger scales, across ownership boundaries, and in collaboration between the agencies and landowners.”
- “Consider developing region-wide monitoring strategies across broad areas, funded by all agencies, and led by the research station or area ecology programs.”

FOREST STEWARDSHIP SERIES

Unfortunately, I had to take a little hiatus from the Forest Stewardship Series to be able to execute the Biomass Summit described above, but I am really looking forward to the following classes, the first Thursday of every month this Spring:

February 7, Business Management for Forests and Woodlands
March 9 - Living on a Few Acres Conference
April 4 - Establishing Native Trees and Plants
May 2 - Forest Insects and Disease
June 6 - Harvesting and Marketing Wood Products

Just like 2018, you can opt to take individual classes or sign up for the entire series at a discount. Stay tuned for upcoming registration information!

BIO MASS SUMMIT

OSU Extension, in partnership with the Ochoco Forest Restoration Collaborative (OFRC) and the Central Oregon Intergovernmental Council (COIC) recently hosted a one-day Biomass Summit in Prineville, Oregon. Over 90 people attended this event, which featured 16 biomass and wood products experts from throughout the Pacific Northwest.

The purpose of the summit was to discuss opportunities and barriers to utilizing and marketing products from the small diameter wood that comes out of the forest during most forest restoration and fuels reduction efforts.

The Summit was comprised of four panels which focused on:

2. Scaling facilities to meet the local supply (public and private land) and a feasible demand.
3. New technologies and promising markets: torrefaction (process to convert biomass into an efficient, coal-like fuel), cross laminated timber, mobile biochar, firewood, integrated facilities and sort yards, juniper wood demand.
4. State and federal policies and incentives to invest in biomass utilization.

If you missed the event, you will have a chance to learn from the panels as we will be crafting blog posts on each panel topic in the coming months. You will be able to find these posts at: http://ochocoforest.org
The pine butterfly (Neophasia menapia) can be a serious defoliator of ponderosa pine in western North America. From 2008 to 2012, the Malheur National Forest was subject to an outbreak of pine butterfly in ponderosa pine, peaking at ~250,000 acres of forest visibly defoliated in 2011. The outbreak dropped to ~100,000 acres in 2012, and was gone in 2013! A spectacular crash!

Whether or not trees die following such outbreaks has been a subject of debate for decades, and so far no consensus has emerged. We monitored 441 sample trees from 15 randomly located plots for mortality from 2012 until 2016, post outbreak. Within this monitored population, 35 trees died, giving an annual mortality rate for this population of 2.05 percent - a relatively low number, indicating that the outbreak did not cause massive mortality in the short term. At least that was our conclusion as we retired the plots. However, then a drought intensified, and western pine beetle (Dendroctonus brevicomis) moved into these stands, causing significant mortality. Although we don’t know if the trees recovered before the drought caused increased stress, our initial analysis indicates highest bark beetle mortality is currently in areas with the most years of defoliation.

From this single case study, we conclude that climate following the defoliation event is an important variable that may influence whether tree mortality will occur, but defoliation severity and number of years of defoliation also matters. Our current plan is to return to as many of our monitoring trees as possible next year (2019) and increment core those trees to determine the patterns of growth loss associated with defoliation, but also to determine if the trees recovered before drought set in. This will help determine if the bark beetle mortality is related to the butterfly caused defoliation or drought.
## Log Market Report


To subscribe contact: **John Lindberg**
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Vancouver, WA 98665
360-693-6766
logmkt@comcast.net

### Life History of the Pine Butterfly (Neophasia menapa)

From 2008 to 2012, the Malheur National Forest was subject to an outbreak of pine butterfly in ponderosa pine, peaking at ~250,000 acres of forest visibly defoliated in 2011.

Image Credit: USDA Forest Service, Pacific Northwest Region, State and Private Forestry, Forest Health Protection.

### Log Market Report

<table>
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<tr>
<th>Location</th>
<th>Species</th>
<th>CR</th>
<th>6-11&quot;</th>
<th>12-17&quot;</th>
<th>18-23&quot;</th>
<th>24&quot;+</th>
<th>Grand fir/White fir</th>
<th>Lodgepole Pine</th>
<th>Engelmann spruce</th>
<th>Pulp/Chip Logs</th>
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<td>400-460</td>
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Fire On Your Land
What and Who You Need to Know
By Nicole Strong, OSU Extension Forester, serving Crook, Deschutes, Jefferson Counties and the Confederated Tribes of the Warm Springs

Experiencing wildfire on your land can be emotionally and financially devastating. You have put considerable time, energy, and money into your land and now it can feel overwhelming to try to start all over again.

The good news is that you are not alone. There are many people who are here to provide technical assistance and guidance to financial resources and other support as you chart a path forward. The following gives you a very brief introduction to where you might start, and who you can reach out to for help.

Assess Your Land
A good place to start is by assessing the extent and severity of fire on your land, and develop a prioritized plan to address your short- and long-term goals. On parts of your land that experienced low severity fire (shrubs and smaller trees are burned but majority of the larger trees will survive), little or no restoration efforts may be needed. Places where you experienced high severity fire might require immediate work to stabilize and protect the soil and/or reestablish vegetation prior to winter precipitation.

Take a walk or a drive around your land. You might also see if neighboring state or federal agencies have flown near your property and are willing to provide aerial photos. Depending on how you like to organize information, you might draw a map or make a list of your various stands with descriptors including:
- Intensity burned (Low, Mixed, High)
- Survival rate of overstory trees (%)
- Signs of soil scorch
- Bark beetle risk (low, med, high)
- Down wood (estimate stems/acre)

Based on your assessment, you might conduct one or several of the following restoration activities:
- Managing noxious weeds
- Salvage logging
- Reforestation
- Soil stabilization
- Wildlife habitat enhancement
- Range improvement

It is important to remember that you need to follow the Oregon Forest Practices Act (OFPA), including submitting notification of operations, following requirements for leaving snags and down logs, protecting streams and wetlands, and preventing future fires, when conducting any post-fire restoration activity on your property. For guidance and clarification of OFPA requirements, please contact your local Oregon Department of Forestry (ODF) Stewardship Forester.

TECHNICAL AND FINANCIAL ASSISTANCE
Before beginning any post-fire rehabilitation, I recommend you contact one or all of the following resources:

**Oregon Department of Forestry: Find your Local Stewardship Forester**
Your local ODF Stewardship Forester can provide technical assistance and help you identify available cost share programs, state grants, & state & federal income tax credits. [https://www.oregon.gov/ODF/Working/Pages/FindAForester.aspx](https://www.oregon.gov/ODF/Working/Pages/FindAForester.aspx)

**Oregon Department of Fish & Wildlife (ODFW).**
ODFW biologists will be able to help you develop a restoration plan that keeps wildlife habitat in mind. They often also can provide financial assistance for native plant restoration, grass seeding, and other projects. [https://dfw.state.or.us/lands/AH/contact.asp](https://dfw.state.or.us/lands/AH/contact.asp)

**Oregon State University Forestry & Natural Resources Extension:**
Find your local office. Your local OSU Extension Forester can help you develop your restoration plan and point you in the right direction for financial assistance opportunities. [https://extension.oregonstate.edu/find-us](https://extension.oregonstate.edu/find-us)
Natural Resources Conservation Service: Local Service Centers. NRCS foresters can provide technical assistance to help you develop your restoration plan and identify potential federal sources of financial assistance (EQUIP, CRP, Emergency Forest Restoration program) for restoration & fuels reduction to prevent future fires. https://www.nrcs.usda.gov/wps/portal/nrcs/main/or/contact/local/

READING RESOURCES

Oregon Department of Forestry: Help After a Fire
https://www.oregon.gov/ODF/Fire/Pages/AfterAFire.aspx

Natural Resources Conservation Service: After the Fire: Resources for Recovery
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/programs/financial/eqip/?cid=stelprdb1261654

Oregon State University Extension Service Fires Resources
https://extension.oregonstate.edu/forests/fire

If you have trouble accessing any of these websites or resources, please email me or call me and I will help you get the right contact information to move ahead.

Nicole Strong
nicole.strong@oregonstate.edu
541-548-6088

You might find during your assessment that some areas experienced light fire and trees have survived. Photo credit: Ken Bevis, WA DNR

There are many foresters, soil scientists, and biologists in Oregon who are available to help you plan your next steps after a fire. Photo credit: Ken Bevis, WA DNR
CREATING A RELIABLE FOREST INVENTORY

New Online Tools

By Bob Parker, Extension Forester in Grant and Baker Counties
Photos and Images courtesy of Silvia Terra. www.silviaterra.com

An essential tool for managing your forestland property is a well thought out management plan, and an important component of any management plan is a reliable forest inventory. A good inventory provides much needed information such the species, size, age and density, or stocking, of your trees which you can use to determine how your woodlands are doing, and what management actions may be needed such as reforestation, thinning or other treatments.

But how can you acquire an inventory? You can hire a forestry consultant who has the expertise and experience to do the work, or you may want to do the work yourself. The good news is that with some training and study and the right tools, you can create a reliable inventory.

Before starting, the most important thing you’ll need is a good understanding of cruising fundamentals and the following publications provide an excellent overview:

• https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9058.pdf
• https://catalog.extension.oregonstate.edu/pnw630

Designing a good inventory system requires addressing questions such as how many sample plots are needed, what kind of plots, what kind of data do you need to collect, and how to use the data to calculate stand density, board foot volume per acre and so on.

When you’re ready to design a cruise, go to the Silvia Terra website (www.silviaterra.com) and create an account, then download the software on your mobile device you’ll use to collect data in the field (cell phone, tablet, etc.).

It is strongly recommended that you view the several instructional videos on the website, they’re very helpful!

On your computer, you identify a stand of timber to cruise and design the cruise by selecting the inventory options desired. The program will automatically create a map showing all the needed plots and where they need to be placed on the ground.

Professional quality forest inventory or “cruise” software programs are available but tend to be expensive and complicated. Fortunately, there are now some affordable, high quality and easy to use programs available online. Examples are Plot Hound, Forest Metrix, T-Cruise and Two Dog. The forest inventory classes we are offering will utilize the Plot Hound system. This is not an endorsement of Plot Hound, it is simply the only one we are currently familiar with, and it is a good representation of what these tools offer.
Nothing to install. Be cruising in minutes.

Then log into Plot Hound on your mobile device and select the cruise. Each plot is georeferenced and the GPS* system on your device will give you the distance and bearing to each plot, literally guiding you from your chair to the plots!

When all the plots are completed, the data will automatically transfer to Silvia Terra who quickly calculates the cruise information and posts the information to your online account. Voila! You have an inventory!

Obviously, this is a short and simplified overview but hopefully will give you a sense of how the system works. As the company advertises, it's a straightforward program that takes a lot of the work out of designing and calculating a cruise and provides reliable data.

*If your forest is in an area with excellent cell phone coverage, you're likely to have functional GPS capability (georeferencing) through your phone or tablet. If you have poor cell coverage you'll need to use pair your phone/tablet with an external GPS unit, via bluetooth, to obtain accurate location information.
SO YOU’VE GOT A FOREST... NOW WHAT?
Things you should know as a new forest owner or manager.

Three offerings of this informative class:

Wed, Dec 5, 5:30 to 7:30 pm, Union County OSU Extension Office, Conference Room, 10507 NE McAlister Road, La Grande

Thurs, Dec 6, 5:30 to 7:30 pm, Wallowa Resources Stewardship Center, 401 NE 1st St, Enterprise

Wed, Dec 12, 5:30 to 7:30 pm, BMCC, Umatilla Hall Room U-10, 2411 NW Carden Ave, Pendleton

Join your local team of Extension Forester, ODF Stewardship Forester, NCRC representative, and other cooperators for answers to some of the most common questions we encounter from new forest owners, or persons newly thinking about forest management.

Topics will include how forestland tax systems work, when you need permissions to conduct forest operations, where you can go for on-site, educational, and cost share assistance, and how to develop or obtain a helpful forest management plan.

Have a neighbor who is not yet managing their forest? Please invite them to one of these workshops!

The classes are free, but please register in advance using the registration link at https://extension.oregonstate.edu/union (look in the Events section), or by calling the Union County OSU Extension Office at 541-963-1010.
Rural Eastern Oregon, like other rural areas across the state, seeks to sustain its communities through sustainable natural resource management. Economic and social wellbeing are inextricably tied to the health of our natural resources, often in ways that are either not well understood, or recognized. This interdependence effects much of the region’s economic base including agriculture, the forest products industry, tourism, and recreation. Even our water supply is tied to forest health! The Baker City Watershed produces large volumes of irrigation water used for crops so if the watershed is ever burned over in a wildfire, the impact would be immediate, and severe.

The Baker County Private Woodland Association (BCPWA) recognized the importance of this interdependence and decided action was needed. The result was the creation of the Baker Resources Roundtable which held its first Roundtable discussion on June 12 in Baker City. The Roundtable, hosted by BCPWA with help from Wallowa Resources, gathered people from across the community representing woodland owners, the timber industry, recreation & tourism, farmers, ranchers, county government, k-12 education, public natural resource agencies and representatives for Oregon legislators.

The goal for the initial Roundtable meeting was to create a shared understanding of the many challenges to community and natural resource sustainability, and identify specific actions to meet those challenges. The process was facilitated by assigning the participants to five discussion groups: working together to sustain our water resources; benefitting from tourism and recreations opportunities; building and expanding forest product markets; challenges and opportunities in the Wildland Urban Interface (WUI); and cultivating the next generation of Stewardship Leaders.

Each group was tasked with identifying and prioritizing actionable goals and report their conclusions to the whole audience. Several project ideas were created and some have begun beginning to move forward. For example, there was substantial interest in providing job skill training for high school students and young adults and connecting them with local employers. The Baker School District, Baker Technical Institute and a local employment agency met with a Roundtable committee to initiate discussions on how to work together to provide “on-the-job” training for academic credit as a means for students to make money and gain employable skills. Local employers have expressed strong interest in a reliable employee pool and a Roundtable committee has scheduled meetings to work on developing relevant curriculum. Stay tuned for future developments!
Dear Alicia,

There are four leaf pigments that account for leaf color and the changes that occur during the autumn. First is chlorophyll. Chlorophyll gives leaves their green color. This pigment absorbs energy from the sun during the process of photosynthesis. As days get shorter and nights get cooler, conditions for producing new chlorophyll become less favorable. Nitrogen and phosphorous are drawn from the leaves for winter storage in the twigs and branches. As chlorophyll production slows down and finally stops, the green color fades away.

Second are things called carotenid pigments. These pigments are responsible for the yellow and orange colors. The pigments are always in the leaves to help the chlorophyll capture sunlight, but during the summer they are covered up by the green color. As the chlorophyll fades away, the carotenid pigments become visible. Examples of the yellow and orange colors of carotenid pigments come from yellow poplar, bigleaf maple and aspen.

Third are the tannins. Tannins make up the gold and brown colors in the autumn leaves. Along with carotenids, tannins are always present and become the dominant color as the chlorophyll fades away. Examples of gold and brown leaves can be seen in the oaks and beech trees.

The forth are things called anthrocyanins, which are responsible for the pink, crimson and purple fall colors. This variety of colors comes from the formation of slightly different compounds that are influenced by the pH level of the sap in the cells of the leaves. Examples of these colors can be found in sugar and red maple, sweet gum and sumac. So, now you know why leaves are so pretty during the autumn of the year.

Treeman