# TREMBLINGS

## NEWSLETTER & BULLETIN BOARD

*Vol. 5(2), May 2014*


***"…partnering to preserve and restore healthy aspen ecosystems."***

**NOTICE:** The WAA is a user-driven organization. Please send news items and announcements, contributions, **recent reports & publications**, photos, and commentary ideas to Paul Rogers: p.rogers@usu.edu. We encourage you to share *Tremblings* with your friends and colleagues. **New members welcome!**

## WAA HAPPENINGS

**WAA Briefs—**In a continuing effort to reach out to professionals using a variety of easily digestible formats, we are launching a new series of short informational updates called "WAA Briefs." Attached at the back of this edition of *Tremblings* is WAA Brief #1, "Building Resilience into Quaking Aspen Management." Please check it out, print it off, and pass it along to your colleagues. We'd love to hear your thoughts on content, format, or suggestions for additional topics.

**Utah's New "State Tree"**—On March 26, 2014 Gov. Gary Herbert signed the bill designating the Quaking Aspen as the Utah's new "state tree." Though largely symbolic, we are hopeful this new designation will bring added recognition to management and science surrounding the tree, as well as devoting resources toward addressing issues related to threatened aspen communities. The previous state tree was the Blue Spruce (*Picea pungens*).

**Fire, History, Resilience Webinar—**If you missed the March 18 webinar titled, "Fire, historical change, and resilience management in Quaking Aspen" it is now archived online for your downloading convenience. Discussion features Douglas Shinneman (USGS), Dominik Kulakowski (Clark University), and Paul Rogers (Utah State University) addressing these key areas of our evolving understanding of aspen ecology. Additional webinars are planned for 2014-15 on other aspen topics.

*Prescribed fire is ignited May 1, 2014 within the giant Pando Aspen Clone as part of a larger experiment to test recruitment rates under multiple treatments and protection via fencing. Pando is a genetically identical set of ~47,000 ramets covering 43 ha/106 acres. Recently, the clone has begun a rapid decline with little or no ramet recruitment (Photo: Paul Rogers).*

## UPCOMING EVENTS

**Platte River Valley Aspen Workshop**—June 19-20 in Saratoga, Wyoming. The workshop will feature and evening presentation June 19 and a field excursion to discuss a variety of wildlife/aspen situations in the Platte River Valley. This event is sponsored by Wyoming Game and Fish and the Platte Valley Habitat Partnership. Contact Katie Cheesbrough for more information.

**Trinchera Ranch Aspen Workshop**—This June 25-26 workshop will examine aspen issues and address interagency and private landowner policies and cooperation. The event will include regional and national decision makers from state and federal

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agencies, as well as select western ranch managers and owners. Our goal is to work toward multi-agency and landowner initiatives that provide the greatest resilience for western aspen communities. The workshop is currently full (due to space limitations). Sponsoring organizations include the WAA, Western Landowners Alliance, Trinchera Ranch, and Wyoming Wildlife Federation.

**Aspen Restoration, Lassen National Forest**—The Lassen NF is hosting field tours July 22-23 to look at a variety of treatments and situations affecting aspen. The theme is, "Implementing Aspen Restoration: 15 years of examples and lessons learned on the Lassen National Forest." Contact Bobette Jones for more details.

**Additional 2014 Aspen Field Workshops**—Plans are shaping up for three additional field workshops addressing aspen and forest management on the Custer NF, Montana (Sept.) and Lake Tahoe Basin, California (Oct.). We will announce additional details as they become available.

**IUFRO World Congress**—Salt Lake City will host the 2014 World Congress of the International Union of Forest Research Organizations (IUFRO) in conjunction with the Society of American Foresters (SAF) and Canadian Institute of Forestry (CIF/IFC) annual conventions October 5-11. Over 5,000 delegates from more than 100 countries are expected to attend this unique gathering. A convention that occurs at five-year intervals, **IUFRO has not been hosted in the U.S. since 1971!** Issues will range from biodiversity, to changing climates, to forest health, to sustainable silviculture and biomass production. We expect multiple aspen-centered field trips and special topic sessions lead by WAA members.

## COMMENTARY

### Restoring Aspen in Rocky Mountain National Park

**Therese Johnson**, Biologist, Rocky Mountain National Park, Fort Collins, Colorado

In 2008, when Rocky Mountain National Park's Elk and Vegetation Management Plan (EVMP) was approved, aspen stands on primary elk range had not recruited new tree-sized stems for at least 35 years as a result of heavy elk browsing. Research showed that the distribution and abundance of aspen in the park declined during the 20th century, and modeling indicated that a continuation of high elk densities could result in the complete loss of aspen clones in high elk use areas. Aspen are rare in the park, but are important because they provide habitat for a disproportionately large number of plant and animal species compared to other habitat types.

The EVMP relies on a variety of conservation tools including temporary fencing, elk culling, and elk redistribution to reduce the impacts of elk on vegetation and to restore the natural range of variability in the elk population and vegetation conditions based on our current best understanding. An important objective of the plan is to prevent the loss of aspen clones on the primary elk range, with at least 45% of stands recruiting new trees. To help achieve this objective the plan calls for constructing elk exclosure fences to protect up to 65 ha of aspen, about 1/3 of the of aspen on primary elk range, from browsing until suckers grow out of reach. In 2009-11 we installed fences to protect about 18 ha (44.48 acres) of aspen in 10 stands distributed across the winter range. Most of the fences were built using heavy woven steel mesh, though we also experimented with using a polypropylene net material for very small stands, as a means of reducing costs and construction impacts on wilderness. The fences are wildlife-friendly, with a 0.40 m (16 inch) gap along the bottom and just

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under 2 m (6.56 ft.) tall, so that most other species are able to access exclosures. The fences also incorporate gates and visitors are encouraged to go inside to explore these areas as restoration progresses.

After only two-to-four growing seasons, aspen response has been impressive inside many of the fences, with young aspen suckers now several meters tall in some areas. Preliminary analysis of data collected in 2013 indicates some recruitment is occurring outside, as well as inside fences. We plan to fence additional aspen stands in 2014-15, and will continue to monitor aspen reproduction and growth across the elk range. As we move forward adaptively implementing the EVMP in coming years, we could use fire or mechanical treatments to stimulate suckering if needed, in addition to adding and removing fences to achieve aspen objectives, and continuing to manage the size and distribution of the elk population.

## RECENT ASPEN PUBLICATIONS

Bartos, D. L., K. Tshireletso, and J. C. Malechek. 2013. Response of Aspen Suckers to Simulated Browsing. Forest Science **60**:402-408.

Dobarco, M. R. and H. Van Miegroet. 2014. Soil Organic Carbon Storage and Stability in the Aspen-Conifer Ecotone in Montane Forests in Utah State, USA. Forests **5**:666-688.

Madritch, M. D., C. C. Kingdon, A. Singh, K. E. Mock, R. L. Lindroth, and P. A. Townsend. 2014. Imaging spectroscopy links aspen genotype with below-ground processes at landscape scales. Philosophical Transactions of the Royal Society B: Biological Sciences **369**:20130194.

Mallik, A. U., D. P. Kreutzweiser, and C. M. Spalvieri. 2014. Forest regeneration in gaps seven years after partial harvesting in riparian buffers of boreal mixedwood streams. Forest Ecology and Management **312**:117-128.

Martin P. Schilling, Paul G. Wolf, Aaron M. Duffy, Hardeep S. Rai, Carol A. Rowe, Bryce A. Richardson, and K. E. Mock. 2014. Genotyping-by-Sequencing for Populus Population Genomics: An Assessment of Genome Sampling Patterns and Filtering Approaches PloS one **9**:e95292.

Reyes-Hernández, V. and P. G. Comeau. 2014. Survival probability of white spruce and trembling aspen in boreal pure and mixed stands experiencing self-thinning. Forest Ecology and Management **323**:105-113.

Robles, H. and K. Martin. 2014. Habitat-Mediated Variation in the Importance of Ecosystem Engineers for Secondary Cavity Nesters in a Nest Web. PloS one **9**:e90071.

Rogers, P. C., S. M. Landhäusser, B. D. Pinno, and R. J. Ryel. 2014. A Functional Framework for Improved Management of Western North American Aspen (*Populus tremuloides* Michx.). Forest Science **60**:345-359.

Rogers, P. C. and C. M. Mittanck. 2014. Herbivory strains resilience in drought-prone aspen landscapes of the western United States. Journal of Vegetation Science **25**:457-469.

Schafer, A., R. Man, H. Y. Chen, and P. Lu. 2014. Effects of post-windthrow management interventions on understory plant communities in aspen-dominated boreal forests. Forest Ecology and Management **323**:39-46.

Worrall, J., S. Marchetti, and G. E. Rehfeldt. 2014. Sudden Aspen Decline. Report for: Spruce Beetle Epidemic and Aspen Decline Management Response EIS. USFS, Forest Health Protection, Gunnison Service Center. Issue Date: January 28, 2014. 18 p.

## CONTACT WAA:

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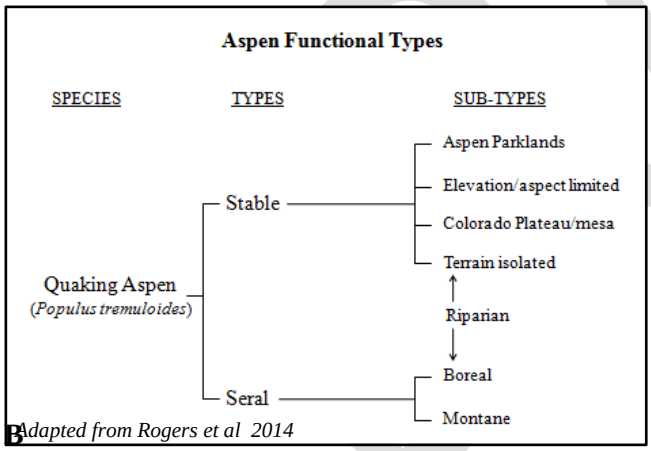
# BUILDING RESILIENCE INTO QUAKING ASPEN MANAGMENT

WAA Brief #1

Paul C. Rogers, Director, Western Aspen Alliance, Utah State University

**Overview**

Throughout the 20th century, forest scientists and land managers were guided by principles of succession with regard to aspen forests. The historical model depicted aspen as a "pioneer species" that colonizes a site following disturbance and is eventually overtopped by conifers. Aspen systems are more diverse, however, than previously described. Not only are there distinctive seral and stable aspen, but variations within these types require appropriate management considerations (Rogers et al. 2014). We recommend a strategic approach to aspen resilience that builds upon traditional aspen ecology and incorporates knowledge of varying aspen functional types, effective monitoring, historical disturbance ecology, and collaborative problem-solving.




*Adapted from Rogers et al 2014*

## Background

In western North America aspen has a storied history in popular, management, and scientific realms. As Euro-Americans settled this region, aspen was favored for livestock forage and passed over, sometimes actively eliminated, as a timber resource. Ironically, these activities during the 19th century inadvertently promoted aspen as they commonly employed fire after use. The elevated level of forest and rangeland burning during this period resulted in many of the mature aspen forests we see today (Kaye 2011).

*Montane seral (L) and Colorado Plateau stable (R) aspen*

Aspen forests are highly dynamic ecosystems; they change through time due to relatively short life spans. Also, their thin bark makes them highly vulnerable to physical damage from insects, disease, wildlife, fire, and even sun scald. Over the past 150 years these forests have experienced long-term declines, even while aspen expanded in other areas (Kulakowski et al. 2013). Many of these decades-long changes result from human interventions to some degree (Kaye 2011).

Many aspen stands carry on an intimate relationship with fire. Forest ecologists are familiar with aspen's susceptibility to both human- and lightning-caused fire in its seral state. As conifers infill over time, the forest becomes more susceptible to fire ignition and consumption. Whether stand-replacing or mixed-severity, fire inevitably will affect these forests. Stable aspen types—where aspen occur with few or no conifers—are largely fire resistant. These forests are difficult to burn unless conditions are just right (Shinneman et al. 2013). Fire's role in aspen forests is highly variable depending on what type of aspen community is at hand, as well as its condition, slope, aspect, and proximity to water, among other factors.

*Browsed aspen suckers soon after wildfire in northern Arizona*

Regardless of disturbance or aspen type, maintaining aspen resilience is highly dependent on local levels of ungulate herbivory (Seager et al. 2013). In the West, prominent aspen browsers include cattle, sheep, elk, and deer. If great care is not taken to protect post-disturbance and post-treatment stands from large ungulate browsing, indispensable flushes of aspen sprouts may be consumed. Repeated browse of aging aspen can accelerate conifer encroachment in seral aspen and lead to system collapse in stable aspen (Seager et al. 2013; Rogers and Mittanck 2014). Key indicators of aspen stand resilience include amount, height, and browse level of regeneration (stems < 2 m tall); number of recruitment stems (>2 m and < dominant mature tree height) as a percent of live mature stems; pellet counts by herbivore species; and mortality of mature trees (Rogers and Mittanck 2014).

**Monitoring and Science Guide Actions**

Decision-making requires current scientific knowledge even when "no action" is the most appropriate course. For example, a clear understanding of aspen types dictates that clearfelling in stable aspen types will yield inappropriate age-class structures more vulnerable to excessive browse. Site- or landscape-specific monitoring prior to implementing actions will help guide appropriate management. Follow-up monitoring will inform adaptive practices, as well. The following steps will help guide management toward aspen resilience:

**ASPEN RESILIENCE STEPS**


**Key Findings:**

1. Aspen types vary considerably and are driven by multiple processes. Understand distinct types and manage accordingly.
2. Connect aspen types to historical ecology. Knowing dominant disturbances, historic impacts, and cover changes places current actions in a long-term context.
3. Browsing intensity varies greatly. Monitoring for herbivory (i.e., recruitment success), and other impacts, prevents acting on invalid assumptions.
4. Stewardship toward resilient aspen increases the chances of success in under changing climates.

**Sources**


Kaye, M. W. 2011. Mesoscale synchrony in quaking aspen establishment across the interior western US. *Forest Ecology and Management* 262:389-397.

Kulakowski, D., M. W. Kaye, and D. M. Kashian. 2013. Long-term aspen cover change in the western U.S. *Forest Ecology and Management* 299:52-59.

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Seager, S. T., C. Eisenberg, and S. B. St Clair. 2013. Patterns and consequences of ungulate herbivory on aspen in western North America. *Forest Ecology and Management* 299:81-90.

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