TREMBLINGS

NEWSLETTER & BULLETIN BOARD

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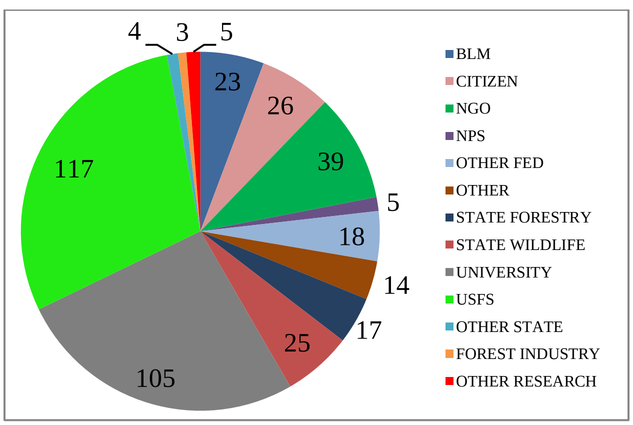
"…partnering to preserve and restore healthy aspen ecosystems."

> **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 Membership Update—Following our membership drive and recruitment at IUFRO in Salt Lake City, October 2014, WAA membership has surged to a new landmark of **401 members**. A breakdown of current membership, by institution type, is presented here:



New members can register at the WAA website.

Schedule an Event—Aspen workshops and winter webinars are starting to take shape. *Tremblings* will keep you updated as this schedule develops further. This is an excellent time of year to begin making arrangements for field workshops, aspen expertise/speakers, webinars, and tours (contact the WAA Director for additional information). Also, if you would like to announce 2015 activities please contact us.

WAA Director, Paul Rogers, speaks with a patron at the IUFRO/SAF/CIF conference in Salt Lake City Utah. The WAA recruited 23 new members and engaged a diverse national and international audience regarding aspen science and management issues.

UPCOMING EVENTS

WAA Webinar: Climate Adaptation—James J. Worrall, USFS Forest Health Protection, Gunnison, Colorado, will be discussing *A Practical Strategy for Managing Forest Adaptation to Climate Change: a Case Study of Aspen and Spruce in Southwestern Colorado* on Dec. 9 at noon-1:00 p.m. MST. To attend, go to the Meeting Room about 10 minutes before the presentation and sign in. **Synopsis**: A review of sudden aspen decline will illustrate anticipated impacts of climate change on forests. Bioclimate modeling will be briefly introduced as a means of approximately quantifying and mapping those impacts. These models, optimized for a local planning area such as a national forest, can be used as part of a practical strategy of adapting forests to climate change, allocating treatments where they will be most efficient and effective into the foreseeable future. A case study of aspen and spruce in southwestern Colorado will illustrate the strategy.

NAFEW 2015—The 10th North American Forest Ecology Workshop: Sustainable Landscapes from Boreal to Tropical Ecosystems will take place June 14-18, 2015 in Veracruz, Mexico. **Abstracts are for oral presentations are due January 15, 2015**. Forest ecologists from around North America will share ideas, knowledge, experiences, and challenges on forest ecosystems of Canada, Mexico and the United States, from boreal, arid and semi-arid, to tropical environments. The background of the 10th NAFEW will be the tropical and the mountain cloud forests of central and southeast Mexico. The program will include three days of oral and poster presentations, as well as one day of in-conference field trips.

COMMENTARY

Aspen soil - The dynamic world below the surface

Helga Van Miegroet, Professor, Wildland Soils and Biogeochemistry, Department of Wildland Resources and Ecology Center, Utah State University

We sometimes forget that the ecosystem services provided by forests are supported by the belowground component of the ecosystem—the soil. Soils, comprised of mineral material, biota, organic matter, water, and gasses represent a microcosm of hydrological, chemical, physical, and biological processes that underlie critical forest functions, such as the ability to hold and supply water and nutrients. As a manager, it is important to know how and to what extent ecosystem changes, whether natural or human-caused, have altered site quality or productive capacity, as it may inform future directions or necessary restoration efforts.

Managers have at their disposal a suite of chemical and physical soil properties to assess qualitative changes in site productive capacity, but the list of potential soil analyses is quite large and often hard to interpret. The challenge is to find those soil indicators that are informative (i.e., sensitive to change and/or with predictive value), are appropriate for the area (i.e., not one-size-fits-all), are practical (i.e., can be used on large tracts of land), and are economical (i.e., have a high information to cost ratio). Among the many soil properties, soil organic matter—or soil organic carbon (SOC), a more common laboratory measurement nowadays—is widely recognized as a key parameter of soil quality and site productivity because it is central to so many vital soil functions that make up healthy productive ecosystems. It contributes to aggregate formation and by this pathway influences soil porosity, which is important to soil water infiltration, water availability to plants, and erosion risk reduction. SOC is a repository of nutrients, and through its influence on biological and chemical processes plays a pivotal role in nutrient release and availability. Furthermore, SOC represents the largest carbon pool in the terrestrial ecosystem, and the ability of soils to store SOC over the long term (i.e., as stable SOC) may add to greenhouse gas mitigation.

Our research in Utah aspen systems has shown that, contrary to common dogma, soils

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under aspen forests store significantly more SOC than adjacent conifer stands in the upper 60 cm (24 in.) of soil, and that this SOC is actually more persistent, i.e., more difficult for microorganisms to decompose and turn into CO_2. By separating SOC into various fractions, we have been able to show that part of the greater SOC stability under aspen is due to the adsorption of SOC to the silt and clay particles in the soil. Further chemical analysis has shown that the SOC is highly transformed by microorganisms such that the vegetation origin can no longer be clearly discerned. Thus, the chemistry of the litter inputs appears less important to SOC stabilization than what happens to their microbial decay products within the mineral soil. We've found that even in mixed aspen-conifer stands, mineral-associated, stable (i.e., microbially less accessible) SOC increases with increasing relative proportion of aspen. This suggests that especially in loam to sandy loam soils (e.g., 40 – 70 % silt + clay), management practices towards aspen conservation can actively contribute to carbon sequestration in the soil. We are currently investigating the correlation between SOC content and nutrient supplying power of soils under various aspen forest conditions...stay tuned!

RECENT ASPEN PUBLICATIONS

Anderegg, W.R., L.D. Anderegg, J.A. Berry, and C.B. Field. 2014. Loss of whole-tree hydraulic conductance during severe drought and multi-year forest die-off. Oecologia **175**:11-23.

Bell, D.M., J.B. Bradford, and W.K. Lauenroth. 2014. Forest stand structure, productivity, and age mediate climatic effects on aspen decline. Ecology **95**:2040-2046.

Berrill, J. and C. Dagley. 2014. Regeneration and Recruitment Correlate with Stand Density and Composition in Long-Unburned Aspen Stands Undergoing Succession to Conifer in the Sierra Nevada, USA. Forest Research **3**: 7pp. doi: 10.4172/2168-9776.1000119

Beschta, R.L., C. Eisenberg, J.W. Laundré, W.J. Ripple, and T.P. Rooney. 2014. Predation risk, elk, and aspen: comment. Ecology **95**:2669-2671.

Buck, J. and S. St. Clair. 2014. Stand composition, proximity to overstory trees and gradients of soil moisture influence patterns of subalpine fir seedling emergence and survival. Plant and Soil **381**:61-70.

Fairweather, M.L., E.A. Rokala, and K.E. Mock. 2014. Aspen seedling establishment and growth after wildfire in central Arizona: an instructive case history. Forest Science **60**:703-712.

Campos, B.R. and R.D. Burnett. 2014. Avian Response to Mechanical Aspen Restoration in Sierra Nevada Coniferous Forest. Restoration Ecology **22**:616-624.

Diner, B., D. Berteaux, J. Fyles, and R.L. Lindroth. 2009. Behavioral archives link the chemistry and clonal structure of trembling aspen to the food choice of North American porcupine. Oecologia **160**:687-695.

Huang, C-Y. and W.R. Anderegg. 2014. Vegetation, land surface brightness, and temperature dynamics after aspen forest die-off. Journal of Geophysical Research: Biogeosciences **119**:1297-1308.

Kane, J.M., T.E. Kolb, and J.D. McMillin. 2014. Stand-scale tree mortality factors differ by site and species following drought in southwestern mixed conifer forests. Forest Ecology and Management **330**:171-182.

Meier, G.A., J.F. Brown, R.J. Evelsizer, and J.E. Vogelmann. 2015. Phenology and climate relationships in aspen (*Populus tremuloides* Michx.) forest and woodland communities of southwestern Colorado. Ecological Indicators **48**:189-197.

Najar, A., S.M. Landhäusser, J.G. Whitehill, P. Bonello, and N. Erbilgin. 2014. Reserves Accumulated in Non-Photosynthetic Organs during the Previous Growing Season Drive Plant Defenses and Growth in Aspen in the Subsequent Growing Season. Journal of chemical ecology **40**:21-30.

Painter, L.E., R.L. Beschta, E.J. Larsen, and W. Ripple. 2014. Recovering aspen follow changing elk dynamics in Yellowstone: evidence of a trophic cascade? Ecology **329**:108-117.

Schwartzberg, E. G., M. A. Jamieson, K. F. Raffa, P. B. Reich, R. A. Montgomery, and R. L. Lindroth. 2014. Simulated climate warming alters phenological synchrony between an outbreak insect herbivore and host trees. Oecologia **175**:1041-14-9.

Snyder, J.N.; Erikson, D. 2014. Restoration Assessment: Rendija Flooding 2013 Post Summer 2014 Plantings Santa Fe National Forest Espanola Ranger District. USDA, Forest Service, Santa Fe National Forest, September 30, 2014. 9 p. [report]

Stevens, M.T., A.C. Gusse, and R.L. Lindroth. 2014. Root Chemistry in *Populus tremuloides*: Effects of Soil Nutrients, Defoliation, and Genotype. Journal of chemical ecology **40**:31-38.

Winnie Jr, J. 2014. Predation risk, elk, and aspen: reply. Ecology **95**:2671-2674.

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