TREMBLINGS

NEWSLETTER & BULLETIN BOARD

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

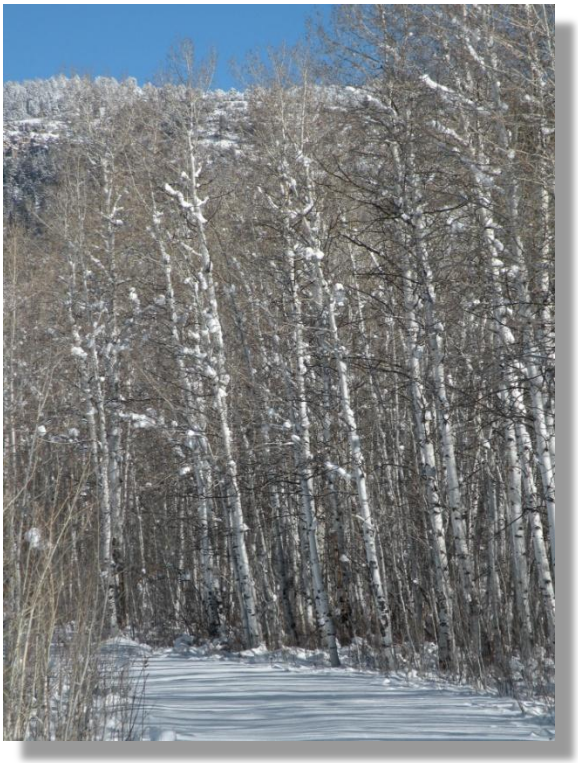
NOTICE: The WAA is a user-driven organization. *Tremblings* will attempt to capture the greater aspen user group's wants and needs. Please send suggestions, contributions, **recent publications**, photos, and commentary to Paul Rogers (p.rogers@usu.edu).

WAA HAPPENINGS

Aspen Restoration Guidelines Released—Utah Forest Restoration Working Group is a collaborative process involving representation from state and federal agencies, NGOs, private industry, ranchers, citizens, and scientists. After nearly two years effort, *Guidelines for Aspen Restoration on the National Forests in Utah* is now available to assist land managers with management decisions involving aspen communities. Many of the lessons learned during this process may be applied to other geographic areas and jurisdictional situations. Download the Guidelines here: http://www.western-aspen-alliance.org/pdf/AspenRestoration.pdf

Fellowships in Aspen/Bark Beetle Studies—Utah State University's Department of Wildland Resources is offering 2 Ph.D. (2011) and 2 MS (2012) student fellowships to investigate *Managing for Resilience in Forested Ecosystems of the Intermountain West*. These fellowships will offer a unique, topic-driven, synergistic environment between select faculty and a multi-student cohort. For further information see: http://www.cnr.usu.edu/wild/htm/available-phd-fellowships

Pando Clone Radio Interview—An aspen clone of over 40,000 stems and 43 ha (106 acres) in size resides in southern Utah adjacent to Fish Lake. A radio interview on "Science Questions" with Ron Ryel, William Ripple, Karen Mock, and Paul Rogers explores the complexity and status of this threatened icon and its value to aspen sciences internationally. Follow link here (Media tab): http://www.western-aspen-alliance.org/



Winter scene: a young aspen community in the Bear River Range, northern Utah (Photo: Paul Rogers).

UPCOMING EVENTS

Mountain Pine Beetle/Aspen Dynamics Workshop—Colorado Forest Restoration Institute and Rocky Mountain National Park will be sponsoring a field-based workshop on interactions between recent Mountain Pine Beetle mortality and aspen regeneration. Is aspen expanding into previously uncolonized forest, or are remnant stands simply regenerating? This event will take place near Grand Lake, Colorado (west side of RMNP) on June 28-29, 2011. Contact Jeff Jones for more details: jeff@theconservationcooperative.org

8th North American Forest Ecology Workshop—This biennial conference brings together forest ecologists from Canada, Mexico, and the United States to share

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recent research advances and participate in day-long field tours of local forests. Abstracts may be submitted for oral and poster presentations until March 22, 2011. The conference will be held at the Hotel Roanoke and Conference Center, in Roanoke, Virginia June 19-23. Further details may be found at: http://www.cpe.vt.edu/nafew/

Herbivory Symposium—**Regaining Ecosystem Resilience: Managing Ungulates in the American West,** Stegner Center, University of Utah, Salt Lake City, May 9-10, 2011. The symposium will feature a diverse array of scientists who have examined affects of domestic and wild ungulates on wildland vegetation. An agenda is in progress and attendance is limited; contact Mary O'Brien (Grand Canyon Trust) for information: maryobrien10@gmail.com.

COMMENTARY

Climate change and sudden aspen decline

Nicholas L. Crookston, *U.S. Forest Service, Rocky Mountain Research Station, Moscow, Idaho*

Climate is the single most influential factor controlling the distribution of plant species. My co-authors and I explored the relationships between climate, observed locations of aspen, and what the future might hold for this species as climate changes. The paper is available at: http://www.treesearch.fs.fed.us/pubs/33823. A key finding is that 76% of the sites that recently exhibited sudden decline are projected to lie outside the 2060 location of aspen's climate profile. Sudden decline, therefore, occurred mostly in areas where future climate estimates are inconsistent with current aspen ranges.

The work involved compiling climate statistics for Forest Inventory and Analysis (FIA) plots in the western USA and building a model that classifies plots that harbor aspen verses those that do not.

A key measure in the model is called the annual dryness index, a ratio of degree days above 5 °C and mean annual precipitation. Of secondary importance is the ratio of warm season to total precipitation. All other important variables use temperature and moisture except one, mean maximum temperature in the warmest month.

Using this model and down scaled data from general circulation models (GCM), the team mapped the contemporary distribution of aspen's climate profile and the future distributions. Some of the maps are illustrated in the paper; all are posted at http://forest.moscowfsl.wsu.edu/climate/species/index.php and are available for public access and further analysis.

Projecting the contemporary climate profile into the future suggested that the area in this region occupied by the profile should diminish rapidly in the next century: 6–41% by the decade surrounding 2030, 40–75% for that surrounding 2060, and 46–94% for 2090 (ranges depend on models and scenarios selected).

Recent climate trends in Colorado were also related to sudden aspen dieback. Of the eight variables in the profile, four reached extreme values during 2000–2003, the period immediately preceding the appearance of damage in aerial surveys. Current survey information indicates that dieback has stabilized in western Colorado. Observations of regeneration occurring in places where moisture levels have recovered are also reported. Climate forecasts include increasing variability as well as changes in mean conditions. Trees living near the margins of their distributions can be

expected to be more vulnerable to these fluctuations exhibiting alternating periods of healthy growth and dieback.

A limitation of the methods used is that it is based on realized niche rather than potential niche. Some evidence suggests that plants will be able to occupy broader climatic conditions than they do now due to increases in CO_2 that provide for increased efficiency in water use. The team acknowledges these issues, but has not addressed them.

Future work includes improving the model's ability to predict climate at specific locations. This will necessitate using variables in addition to elevation that account for climatic variation in complex terrain. Improvements in the climate forecasts from the GCM's, coupled with better methods to down scale are also of interest. Lastly, we intend to consider the genetic variation within the species range. All aspen are not alike, yet the current climate model does not discriminate among clones.

RECENT ASPEN PUBLICATIONS

Calder W.J.; Lifferth, G.; Moritz, M.A.; St. Clair, S.B. 2010. Physiological effects of smoke exposure on deciduous and conifer tree species. *International Journal of Forestry Research* 2010 (Online: Article ID 438930):7 pages.

Durham, D.A.; Marlow, C.B. 2010. Aspen response to prescribed fire under managed cattle grazing and low elk densities in southwest Montana. *Northwest Science* 84(1):141-150.

Mortensen, B.; Wagner, D.; Doak, P. [2010]. Defensive effects of extrafloral nectaries in quaking aspen differ with scale. *Oecologia*. DOI 10.1007/s00442-010-1799-6.

Sturrock, R. N.; Frankel, S. J.; Brown, A. V.; Hennon, P. E.; Kliejunas, J. T.; Lewis, K. J.; Worrall, J. J., and Woods, A. J. 2011. Climate change and forest diseases. *Plant Pathology* 60:133-149.

Utah Forest Restoration Working Group - Ecology Committee [M. O'Brien, P. Rogers, K. Mueller, R. MacWhorter, A. Rowley, B. Hopkin, B. Christensen, P. Dremann]. 2010. Guidelines for Aspen Restoration on the National Forests in Utah, Western Aspen Alliance, Utah State University, Logan, UT http://www.western-aspen-alliance.org/pdf/AspenRestoration.pdf

Vankat, J.L. 2011. Post-1935 changes in forest vegetation of Grand Canyon National Park, Arizona, USA: Part 1 - ponderosa pine forest. *Forest Ecology and Management* 261(3):309-325.

Vankat, J. L. 2011. Post-1935 changes in forest vegetation of Grand Canyon National Park, Arizona, USA: Part 2 - mixed conifer, spruce-fir, and quaking aspen forests. *Forest Ecology and Management* 261(3):326-341.

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