



Quaking Aspen in Utah: Integrating Recent Science with Management

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On the Ground

- Quaking aspen is widely regarded as a key resource for humans, livestock, and wildlife with these values often competing with each other, leading to overuse of aspen in some locations and declines.
- We review trends in aspen science and management, particularly in Utah. Historically, research conducted here holds a prestigious place in international aspen circles.
- We highlight recent studies continuing the tradition to keep rangeland managers informed of important developments, focusing on aspen functional types, historical cover change and climate warming, ungulate herbivory, and disturbance interactions.

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From the boreal forest in the north to central Mexico and from the Pacific Coast to New England, quaking aspen (*Populus tremuloides* Michx.) is the most widespread tree species on the North American continent. The media often trumpets the impending doom of aspen in the American West, yet in Utah we commonly see thriving aspen forests accenting high elevation conifer and meadow landscapes. Groves of ‘quakies’ not only provide valued forage for livestock, they also offer rich biodiversity, water storage capacity, wildlife habitat, aesthetic elements, recreation uses, and fire protection. It is important for us to understand what is happening to aspen in our area, what factors affect their condition, and what prescriptions can be taken to increase ecosystem resilience in aspen forests. As with many complex natural resource issues, restoration of critical ecological processes (e.g., sustainable plant–animal interactions, disturbance regimes, soil development) that interact with competing human needs requires informed participation by a wide contingent of stakeholders.

Science and management of quaking aspen forests is rapidly evolving and much of that development is playing out in Utahⁱ. This follows a long tradition of aspen research originating in the state.^{1,2} A key, long-established, tenant of aspen ecology is the species’ capacity to reproduce both asexually via root suckers and sexually from seed germination. Large groups of aspen trees may be genetically identical clones, many of them still connected by root networks. Traditional practices rely heavily on swift suckering responses following burning or cutting,³ but until recently less notice has been paid to the management ramifications of seedling establishment.⁴ Another, perhaps less appreciated, cornerstone of aspen sciences is that stands come in two primary forms (Fig. 1): seral (meaning they are relatively short-lived and eventually overtopped by competing conifers) and stable (not competing with conifers, long-term growth in pure or nearly pure stands of aspen).⁵ These overarching themes, reproduction and aspen function, are critical to restorative practices, otherwise well-intended actions may lead to aspen loss.⁶

This survey of quaking aspen literature in Utah updates range managers on developments in the field with an eye toward improved and adaptive practices. Seminal works of the past made great strides in translating the findings of aspen research to field practitioners.^{1,2} More recently, we helped produce a compendium of review articles for a Special Issue of *Forest Ecology and Management*ⁱⁱ. Our objectives in the present work are to use these sources, alongside more recent efforts, to examine aspen science as it applies to management within the context of Utah. Specifically, we will: 1) examine key issues affecting aspen communities in the state, 2) explore recent developments in the aspen sciences, much of it centered within Utah, and, 3) place the first two objectives in the context of changing management perspectives. This timely update should spur rangeland, forest, and wildlife managers to engage researchers working in the field, as well as inspire

ⁱ The 70th Annual Society of Range Management Annual Meeting will be held in St. George, Utah 29 January–2 February 2017. This article highlights Utah range science and management. For more information on SRM Red Rock & Rangelands 2017 see <http://rangelands.org/srm17/>.

ⁱⁱ S. St. Clair, P. Rogers (eds.) Resilience in Quaking Aspen: restoring ecosystem processes through applied science. 2013. *Forest Ecology and Management*, Vol. 299. <http://www.sciencedirect.com/science/journal/03781127/299>.

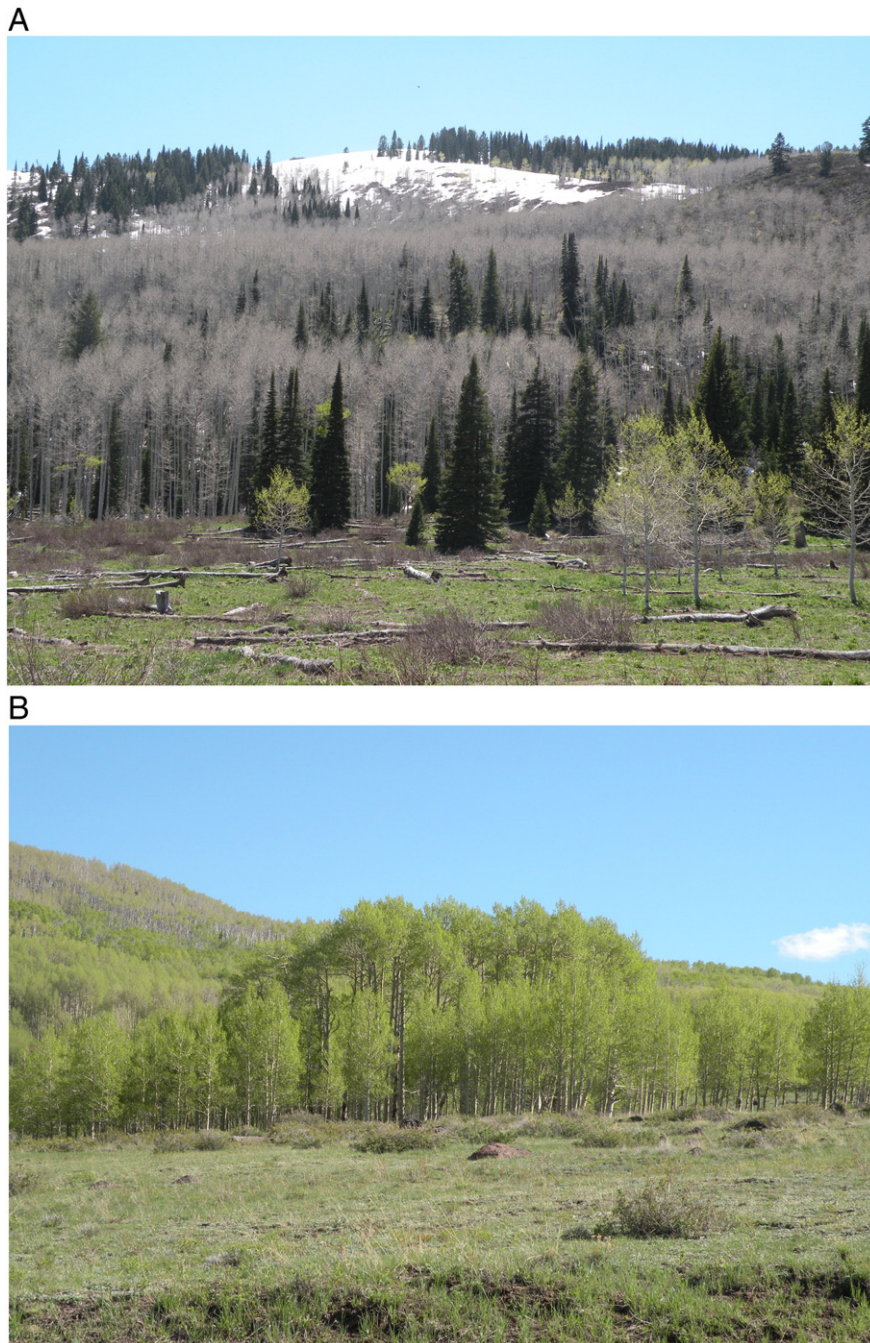


Figure 1. Two primary aspen functional types occur in Utah. **A**, Seral aspen, in the absence of disturbance will eventually be over-topped by competing conifers. The photo is from Logan Canyon, in northern Utah, and depicts a seral stand in mid-succession with subalpine fir (*Abies lasiocarpa* Nutt.) in early spring. **B**, Stable aspen refers to long-term dominance by aspen, with little or no presence of other tree species, and generally not subject to stand-replacing disturbance. This picture shows a stable aspen community on Boulder Mountain, south-central Utah.

collaboration across managerial and agency lines, toward benefiting the state’s aspen resources at-large.

Key Issues

Cover Change, Climate Warming

We often hear about a great change in aspen cover since Euro-American settlement or the imminent demise (a.k.a., ‘sudden decline’) of contemporary aspen. While there is some

truth to such claims, in reality aspen extent and health across Utah are quite variable. Nonetheless, early post-settlement influences across the state did leave an imprint; settlers used fire abundantly to clear land after logging and create forage following often intense grazing.⁷ Similarly, at least in northern Utah, unregulated hunting depleted large herbivores like elk by the early 20th century,⁸ which likely had positive effects on aspen recruitment. Cessation of burning practices, by natives and settlers alike, as well as implementation of fire suppression by

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