Aspen Regeneration: A Range Management Problem

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Aspen (*Populus tremuloides* sp.) is an important, dominant tree species across much of the intermountain west. It grows in the moist montane areas (precipitation zones from 16 to 40 inches), between sagebrush communities at lower elevations and conifer communities at higher elevations. Extensive in size, and very productive, the aspen zone is an important one to range managers. In addition to producing habitat for wildlife, forage for livestock, poles and timber, and regulating water runoff, the cool mountain groves are a valued scenic attraction.

Aspen is a relatively stable component of the landscape that we tend to take for granted. In a grove of smooth barked, slim trees, it is easy to assume that they are young and healthy. Yet aspen can appear young for decades, long after they have reached maturity. The appearance of youth is no substitute for the existence of a young, replacement generation. On a multiple use range, young aspen shoots can be at a severe disadvantage. Without management attention, the success of aspen regeneration is in doubt.

The health of the aspen groves have been watched by savvy range managers for decades. As far back as 1954, Houston wrote:

> The presence or absence of aspen reproduction has long been used as an indicator of range condition. If aspen reproduction was present, the range was considered in satisfactory condition, if absent, in unsatisfactory condition (Houston 1954).

In effect, the aspen trees themselves are a visible "indicator" species.

Aspen is usually classified as a seral species. An aspen grove exists as a single step along the path of succession, a period in the progression of a dynamic forest range. It is not a stable climax woodland. An aspen grove dominates an area until either (1), shade tolerant conifers reach a height sufficient to take over; (2), the aspen grow old and decadent, eventually dying out, leaving brush and grass; or (3), the aspen re-establishes itself after a natural catastrophic event, such as a fire, prevents succession from running its course (Shields 1981). The successional shift to conifers or brush directly affects the habitat, forage, water holding, and recreational aspects of the aspen zone. Of special interest to range managers, Harniss (1981) found that: "In the successional path to conifers, the grasses disappeared first, followed by forbs and then the shrubs as the conifers became established.... With the demise of aspen, wildlife habitat and diversity would tend to decrease in decadent aspen stands". On the lower, drier edges of the aspen range, aspen may be replaced successionally by sagebrush-grass communities to the detriment of livestock and big game.

Aspen trees grow in separate groups of genetically identical clones, connected through the root system (Schier 1981). This is why in the fall you see certain clumps of aspen change color before their neighbors, or notice tree trunk characteristics differing from clump to clump (clone to clone) under similar growing conditions.

Aspen regenerates by two methods, through seeds and through shoots or root suckers. Seedlings require very steady conditions of moisture for the first few years, and so usually do not survive the summers in the intermountain west under the current climate (McDonough 1979). Most, if not all, intermountain aspen regeneration occurs through sprouting root suckers.

Suckering, however, is inhibited by auxin translocated to the roots from growing shoots and leaves, a phenomenon called apical dominance. Disturbances that damage, cut, or kill stems will reduce the flow of auxin into the roots and result in aspen regeneration (Schier 1981).

Where cattle or big game have access to the shoots that do begin to grow, browsing and trampling can lead the conversion to sagebrush and grassland. One scientist stated:

> In relatively recent years man has had considerable impact on the western aspen habitat: (1) His livestock have overgrazed many ranges, which decimated young suckers, especially if they occurred sporadically as advance regeneration in the understory. (2) He has managed big game (deer, moose, and elk) populations to maintain relatively stable numbers near the carrying capacity of the ranges: again, aspen suckers were browsed back repeatedly on many areas. And, most important, (3) he has prevented wildfire from periodically killing the forest, and thus, favoring extensive aspen sprouting.
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> As a result of these impacts, aspen on millions of acres will be replaced by conifers or by brush and grass within a century (DeByle 1976).

One area where the aspen regeneration is easy to observe is along the streams and around the springs where beaver have been active. Beaver are restricted to about a hundred yards from water in their harvesting of aspen, and can entirely devastate (or clearcut) a watercourse.

With proper management, causing a break in beaver colony occupation, the aspen will tend to regenerate itself. Without some form of beaver population control, or reprieve from browsing, denuded streamsides will result.

In today's environment of focused attention upon the health of the riparian zone, the effects of these beaver-denuded streamsides and watersheds upon the ecology of the stream cannot go unnoticed. Stable streambanks with growing vegetation are found to be essential for good fish habitat.

Conifers invading an aspen grove. Approximately 9500 ft in western Colorado. Note lack of aspen regeneration.

Decrepit aspen being replaced by brush at lower edge of aspen zone. Approximately 8000 ft in western Colorado.

Beaver themselves are not the problem. Managed colonies have a positive effect upon small trout streams and their attendant wildlife (Kirby 1975). The key is reestablishment of the streamside vegetation (in this case, aspen) after beaver have harvested it.

Various methods have been used to stimulate aspen reproduction. The Forest Service has used fire, herbicide and clearcutting to remove or kill the above-ground portion of the aspen. This often leads to extensive aspen sprouts from the root systems. In some areas clearcut by humans, as many as thirty to fifty thousand sprouts can be found per acre (DeByle 1976). "Clearcutting" consistently produces the greatest success in regenerating aspen. (Shields 1981).

Fenced off areas are not a prerequisite for aspen regeneration.

Old beaver clearcut with aspen shoot showing browse damage.

Aspen is important to the range manager not simply for its own sake, but also for the entire community it fosters. Without management attention, the aspen-dominated western range will change away from aspen to either conifer-dominated communities or brush and grass communities. The health and vitality of aspen groves cannot be taken for granted.

Maintenance of aspen range productivity demands a long-term perspective from the range manager. The producer primarily worried about this year's forage production must consider the implications of range with seriously depleted aspen groves. Management of the browsing pressures upon aspen regeneration is necessary.

The range manager should pause occasionally and look around for aspen regeneration. In live standing aspen, regeneration will be limited due to apical dominance. Around disturbances, either by fire, clearcutting, or around old beaver ponds, aspen shoots should be abundant. If they are not, over-browsing should be suspected. Reduced or removed livestock from local areas for the first five to

Old aspen stand showing lack of regeneration. Note browse line on aspen in background.

Drainage showing combined effects of beaver use and heavy browsing pressure. Note sagebrush incursion.

Old beaver pond lacking established aspen regeneration 10 years after beaver were removed.

ten years after a disturbance, as well as wildlife control measures should see successful aspen regeneration.

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