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The Development of New Aspen Cohorts: How Many Suckers Create an Adequate Condition and the Relationship with Ungulate Impacts?

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Question: In the development of new aspen stands, how many suckers are required to result in an acceptable regeneration event? How much grazing impact from ungulates, both wild and domestic, should be allowed that would result in an adequate regeneration component?

The answer to the first question is highly dependant upon the response to the second. If herbivory will have no impact on the affected stand or landscape, then several hundred to a few thousand suckers per acre should be adequate.

A major consideration is the type of aspen community being treated. There are two basic aspen types recognized in the Intermountain Region, seral and stable. A distinct desired condition or target stand should be defined for each, during the development of the vegetation prescription. Seral aspen is defined as those stands where aspen are actively replaced over time by conifers. Stable aspen are those areas where aspen remain dominant with little or no conifer replacement over at least one generation (approximately 70-100 years). Mueggler (1989) speculated that as much as a third of the aspen stands in the Intermountain west are stable.

In stable stands, the desired condition is to have multiple cohorts or canopy levels present. Quite often, these stands have pulse regeneration events that are initiated by defoliation or small mortality events in the overstory. Typically these areas do not have a stand replacement event. Occasionally, these stands may only have a single story present. A massive regeneration event may occur at the end of the life cycle of the clone. The general health of the stand must be determined prior to prescribing a need for regeneration. If there are indications of declining health of individuals within the clone or holes in the canopy, and if regeneration is not obvious in the understory then the regeneration treatment should be implemented. Since the lower canopy levels do not require the mass suckering event characteristic of a stand replacement treatment, only a few hundred suckers per acre (500+) at 6 feet in height may be required for that event to be adequate. It is obvious that with this low number of suckers, there would be a lower percentage of grazing hits allowed before adverse impacts would occur. When looking at canopy gaps in stable clones, watch for indications of root rots that would adversely affect aspen suckering. If suckers are not present and root rot is not suspected, then look for indications of grazing impacts.

Selecting stands for treatment where seral aspen is present should follow the strategy developed by Campbell and Bartos (2001). Treatments tend to favor the development of a single cohort with the initiation of the suckering event resulting in tens to hundreds of thousands of suckers per acre. The most critical time for herbivory impacts is between the regeneration disturbance event and when the suckers grow to the desired 6 foot height. During this time it is important to have as many new suckers as possible, depending on site conditions. The fewer suckers per acre present at initiation would dictate that fewer stems could be impacted by ungulates or disease. The objective, depending on habitat type would be to have 2000-5000 stems per acre at 6 feet height over 70% of the area treated. This means that 2000-5000 stems must maintain a strong terminal leader with no grazing hits. The goal from one year to the next is to see a net gain in stand height growth. Another critical monitoring point is to see at least 1000-1500 stems per acre when they are 10-15 feet tall and 1.5 inches DBH.

Grazing impacts can be caused by wild ungulates (moose, elk, deer and antelope) or permitted livestock (sheep and cattle), and in some areas by other small mammals (hares, rabbits, gophers, mice, etc.). Some areas with heavy wildlife use show aspen treatment areas converting to grassland types (Coconino NF in Arizona and the White Ledges Timber Sale on the Fishlake NF). Wild ungulates are difficult to control, however some types of fencing provide adequate protection. Another method is to implement large treatment areas to disperse impacts to allow the acceptable development of the new cohort. Innovative deterrents are being looked at to help reduce wildlife impacts on aspen regeneration. Work in the Black Hills of SD is dealing with using things like "hinging" and "slashing" to provide temporary barriers to allow aspen suckers to become established. **Where adverse wildlife populations are known to exist; if the treatment areas cannot be protected then the treatments should not occur.**

Where wildlife and domestic livestock may both impact the treatment areas, uncontrolled grazing is almost certain to create an unfavorable outcome. In this situation, as well as where domestic livestock is the primary concern, we would have the best opportunity for success by controlling livestock movements. The key in this area is to coordinate vegetation treatments and livestock control between the range permittee, range vegetation staff and the silviculturist. If there is a lack of commitment or a problem with assuring adequate protection for the treatment area then the treatment should not be implemented. Some recommendations to minimize livestock issues include:

- It has been noted on some forests that ungulate use tends to move from herbaceous plants to aspen in the early fall. Many feel that it is triggered by the first frost of the year, however, Crouch reported increases in aspen utilization after herbaceous vegetation reached peak development, usually around the first of August. Shepperd's experience with intense browsing in Arizona occurred between mid-August and leaf fall in mid-September.

- Use by cattle has also been documented on aspen suckers on the Fishlake National Forest in late spring. Mid-season would be the best time to rotate cattle into these treated areas 2-4 years post treatment.
- Fitzgerald and Bailey describe the effect of late-season grazing by cattle on aspen in an experiment conducted in Canada to eliminate aspen suckers encroaching into meadows. They basically found that the late season browsing is very effective in eliminating suckers and discourages re-sprouting. Grazing by domestic livestock should occur earlier in the season when herbaceous cover is most palatable and use of aspen suckers is less likely to occur. The point here is that we can do a lot to help aspen regeneration by better timing of use by livestock. Cows should be moved off prior to the time that adverse impacts would be expected to occur.
- Herding of sheep away from treatment areas has proven to be very effective in reducing impacts to new aspen stands in sheep allotments.
- A standard practice is to exclude grazing until the new aspen cohort is at least 6 feet tall. This is the approximate height where ungulates can no longer reach the top (or terminal leader) of the sucker. It is very important to maintain a single growth axis to develop the best growing stock possible. Depending on site quality it could take 2-5 years to reach the 6 foot requirement, and then begin using that pasture in mid-season.

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