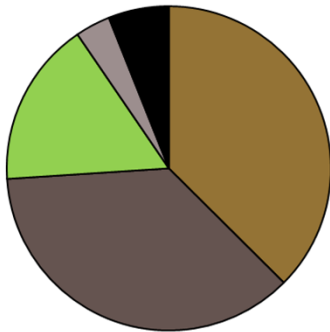


Aspen: Restoration, Management, Monitoring

Aspen is a shade intolerant tree that relies on vegetative reproduction. Aspen in the western U.S. are steadily declining due to the disruption of historic fire regimes and excessive browsing pressure. Aspen enhancement is a priority because aspen provide important ecological services such as biodiversity, forage, and conservation of soil moisture.

Decline

Number of Aspen Stands by Risk of Loss Rating on LNF
(Total=700)



■ Highest ■ High ■ Moderate ■ Low ■ Dead

Restoration

Successful aspen regeneration is dependent upon:

- 1) release of apical dominance to stimulate suckering
- 2) a growth environment that provides sunlight
- 3) protection of aspen suckers from excessive browsing

Enhancement Recommendations

In the Eastern Sierras and Cascades, aspen typically comprise ~ 1% of the landscape. Enhancement treatments primarily consist of conifer removal and/or protection from wild and domestic ungulates.



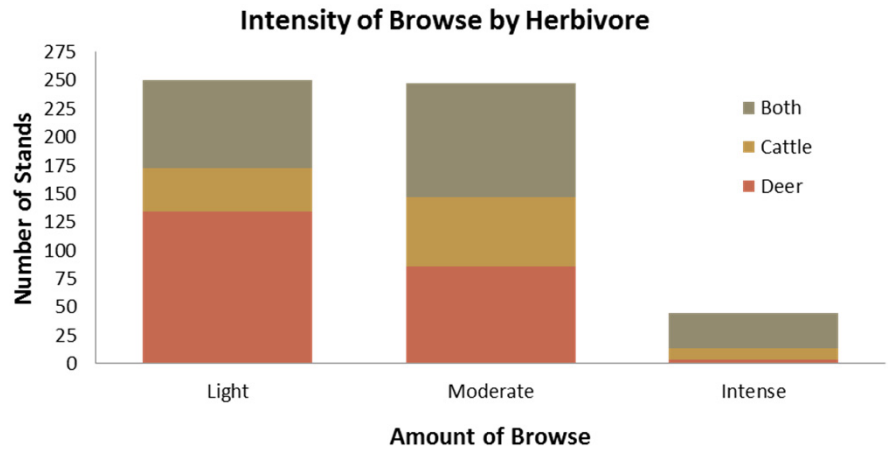
Treatment	Recommended Restoration (No. of stands)
Conifer Removal	670 (96%)
Protection (Fencing)	352 (50%)



Examples of aspen stands that are not successfully regenerating due to excessive browsing by livestock.

Common Aspen Restoration Practices

Stand protection practices such as exclusionary fencing are often recommended where browsing is suppressing aspen regeneration. This is a good option for extremely degraded stands at risk of loss.



2002- aspen regeneration on active allotment (no enclosure)



2008- aspen regeneration 6 years after enclosure



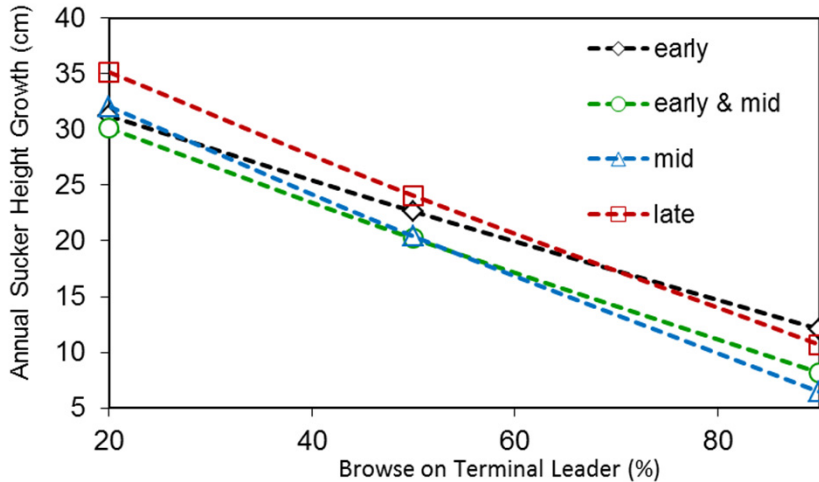
Pole style fence



Wildlife fence

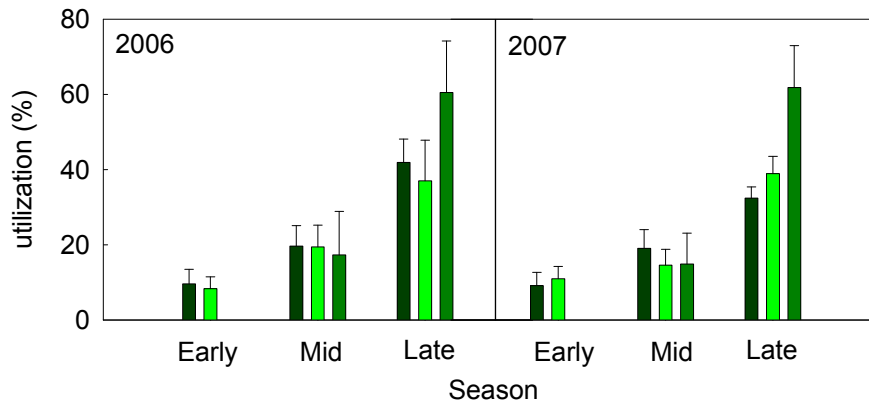
Aspen Response to Browsing

Effect of terminal leader and season of browse on aspen growth



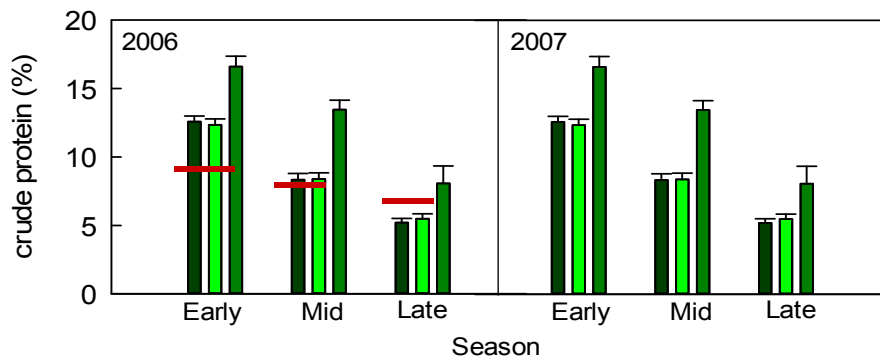
Aspen growth is most negatively affected by browse on terminal leaders. Growth is lowest for suckers browsed mid-season only and suckers browsed both early and mid-season.

Seasonal Utilization by Forage Type



Early season foraging by cattle focused on meadow and aspen understory vegetation.

Seasonal Change in Protein by Forage Type



Forage quality declined with season in all three vegetation types.

— Nutritional requirement for lactating cows

aspen herbaceous
 meadow herbaceous
 aspen regeneration

Management Implications

Relative forage quantity, quality, and cow nutrient demand must be considered when developing seasonal grazing strategies for aspen enhancement.

- Limit defoliation intensity on aspen regeneration during the mid and late growing seasons.
- Ensure that mid and late season use does not occur in consecutive years.
- Early season grazing in management units with aspen essentially creates rest from grazing for aspen stands.
- Season of use and rest from grazing can be managed via rotational grazing strategies such as rest rotation, and/or through good livestock distribution with water and herding.
- Annual variation in precipitation and forage production must be accounted for in grazing strategies, with attention paid to low herbaceous forage production years when use of aspen could occur earlier in the growing season.
- Managers should provide nutritional supplements to ensure that a source of protein and other essential nutrients are available to cattle, as opposed to aspen serving as a supplement source.



Aspen regeneration 1st year after fencing for cattle.



Aspen regeneration 5 years after fencing for cattle.

Jones, B. *et al.* 2011. Cattle selection for aspen and meadow vegetation: implications for restoration. REM 64:625–632.

Jones, B. *et al.* 2009. Effect of simulated browsing on aspen regeneration: implications for restoration. REM 62:557–563.

