



Browsing and Aspen Regeneration on the Uncompahgre Plateau Progress Report Feb. 11, 2011

Dan Binkley & Bill Romme,
with great field work by Ben Lowrance,
Attia Alsanousi, Drew Derderian, and Taylor Elm,
and
great support from Tim Garvey
and the Uncompahgre Project

The issues ...

- Aspen is abundant and highly valued on the UP
- We're seeing a gradual, but steady, loss of aspen across the UP
- Three major ecological processes are driving this loss:



Conifers replacing aspen via natural forest development since the last major disturbance

“Sudden aspen decline” (SAD)
- probably climate related -

Chronic heavy browsing on young shoots
(aspen inside fence on right)



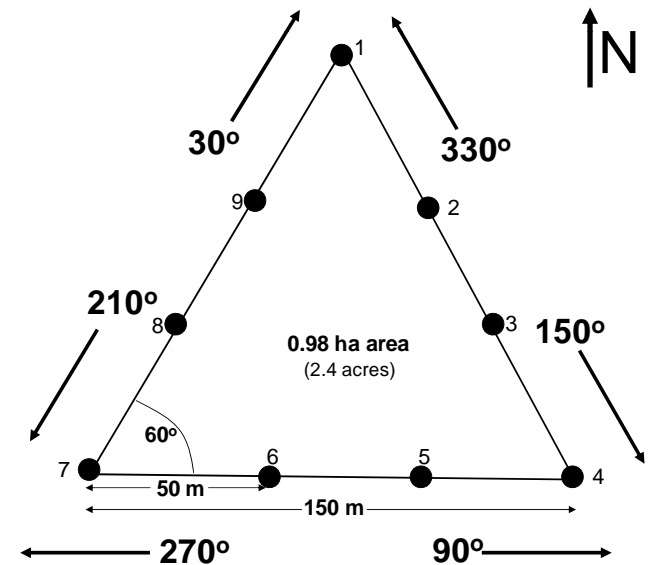
This project focuses on browsing impacts ... we're asking three questions

1. How substantial are the effects of browsing on aspen regeneration (to tree-size recruitment)?
2. To what extent is browsing impact caused by cattle or by deer and elk?
3. What is the spatial pattern of browsing impact across the Plateau ... and are there any apparent explanations for the pattern (e.g., elk populations within local areas; season of use by elk or cattle; basic site factors (such as elevation, forest type, conifer basal area))

1. How substantial are the effects of browsing on aspen regeneration?

Methods ...

- We sampled 64 randomly located points across the UP
- At each point we recorded:
 - Density and height of aspen regeneration
 - Intensity of browsing on aspen shoots
 - Overall forest structure (spp, density, BA)
- We also collected increment cores from aspen taller than breast height to determine age distribution across the UP



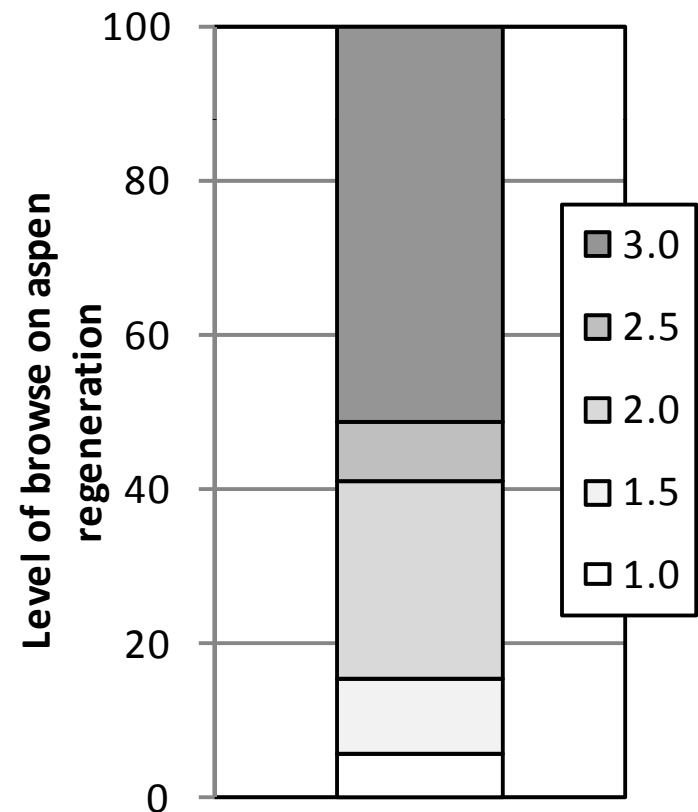
1. How substantial are the effects of browsing on aspen regeneration?

Results ...

Rating system at each point:

- 1 = little if any impact of browsing on height growth
- 2 = browsing apparently preventing some shoots from reaching breast height
- 3 = browsing apparently preventing essentially all shoots from reaching breast height

- 51 points contained aspen shoots
- Average impact level = 2.3
- Impact level = 3.0 in half the points



1. How substantial are the effects of browsing on aspen regeneration?

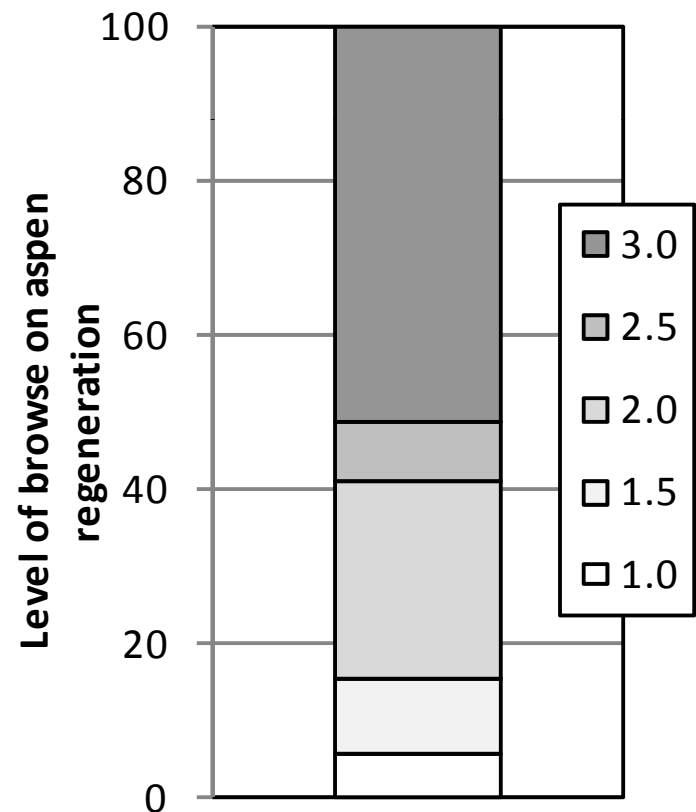
Results ...

Rating system at each point:

- 1 = little if any impact of browsing on height growth
- 2 = browsing apparently preventing some shoots from reaching breast height
- 3 = browsing apparently preventing essentially all shoots from reaching breast height

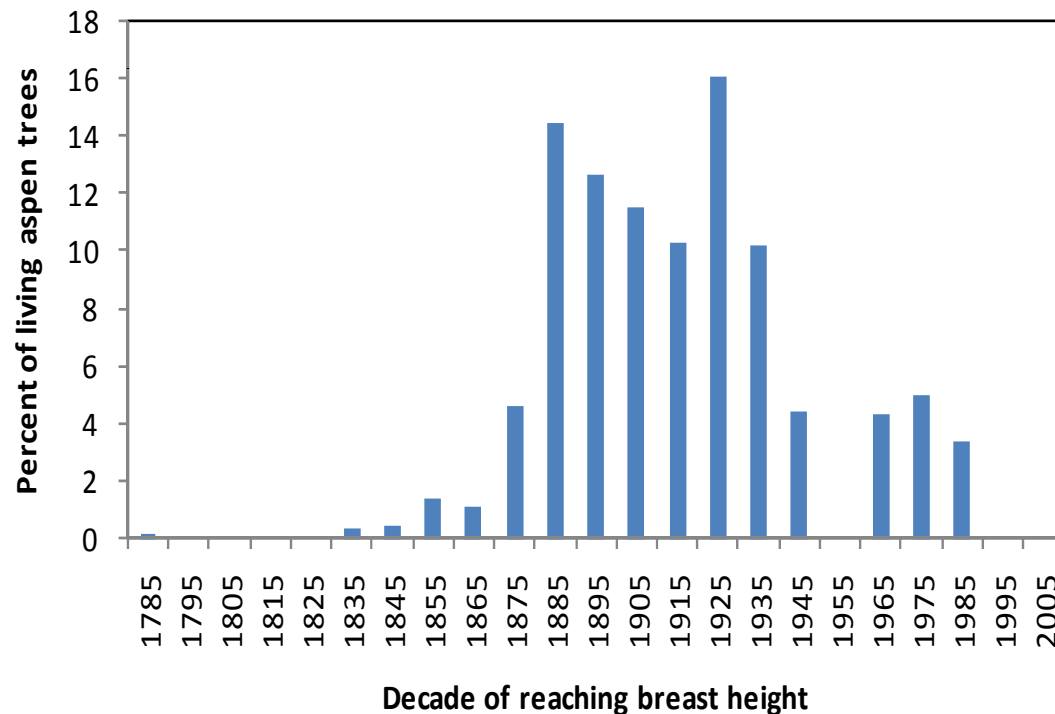
- 51 points contained aspen shoots
- Average impact level = 2.3
- Impact level = 3.0 in half the points

** Conclusion: browsing is preventing aspen regeneration (growth to tree size) across most of the UP*



1. How substantial are the effects of browsing on aspen regeneration?

Results (cont.) ...

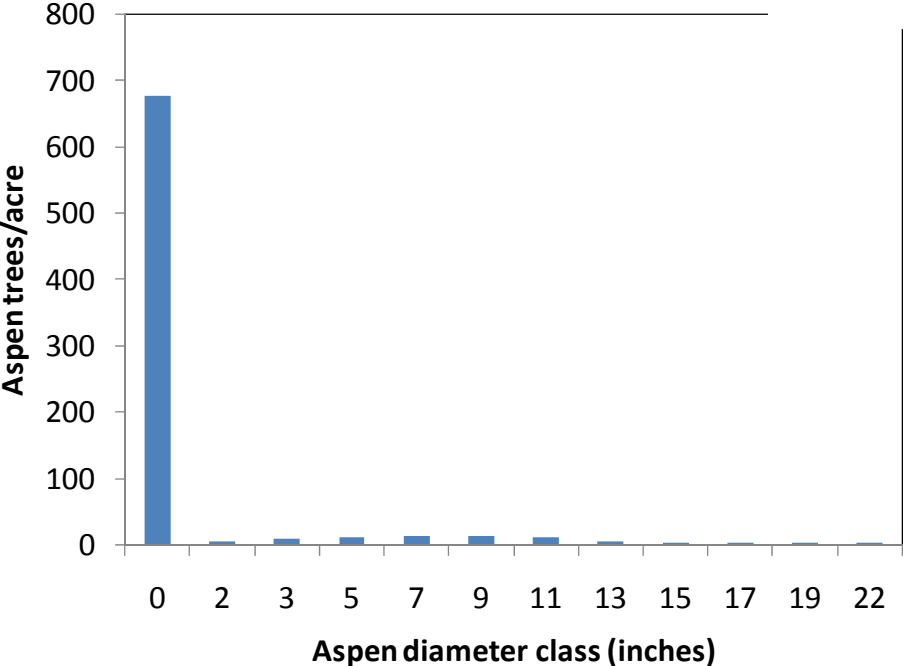
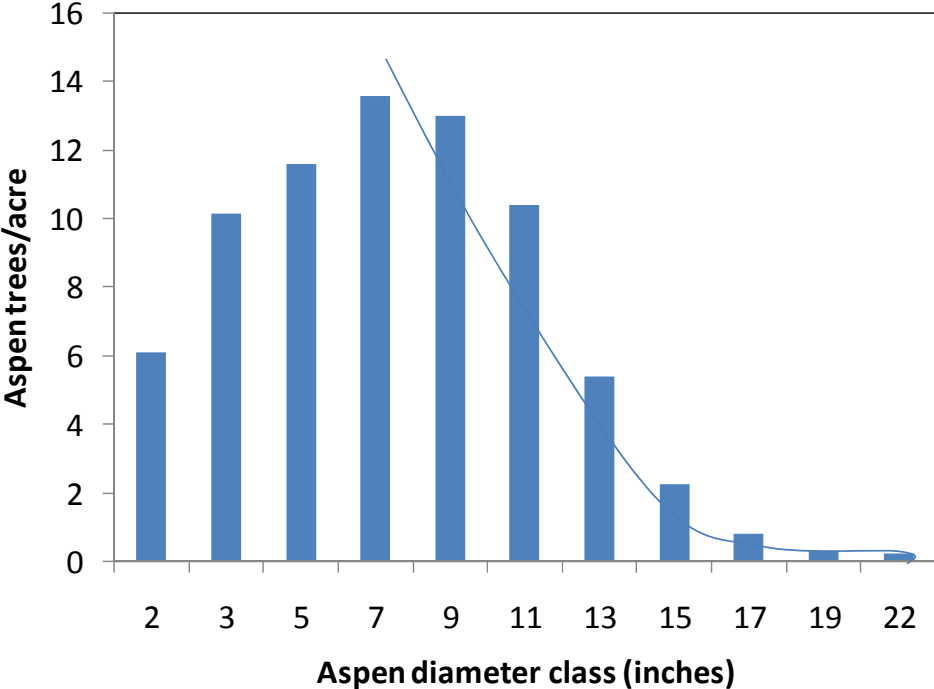


-Aspen age distribution shows:

-Pulse of regeneration in late 1800s ... continuing into early 20th century

-Very low recruitment since mid-1930s ... with almost none after mid-1980s

Here's the story told in tree size classes (rather than age)

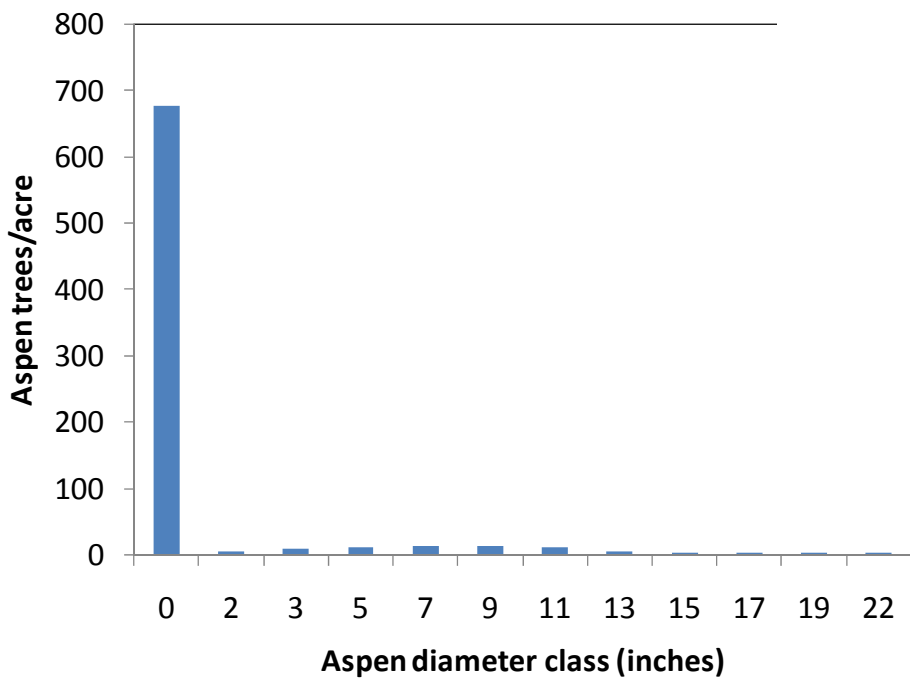
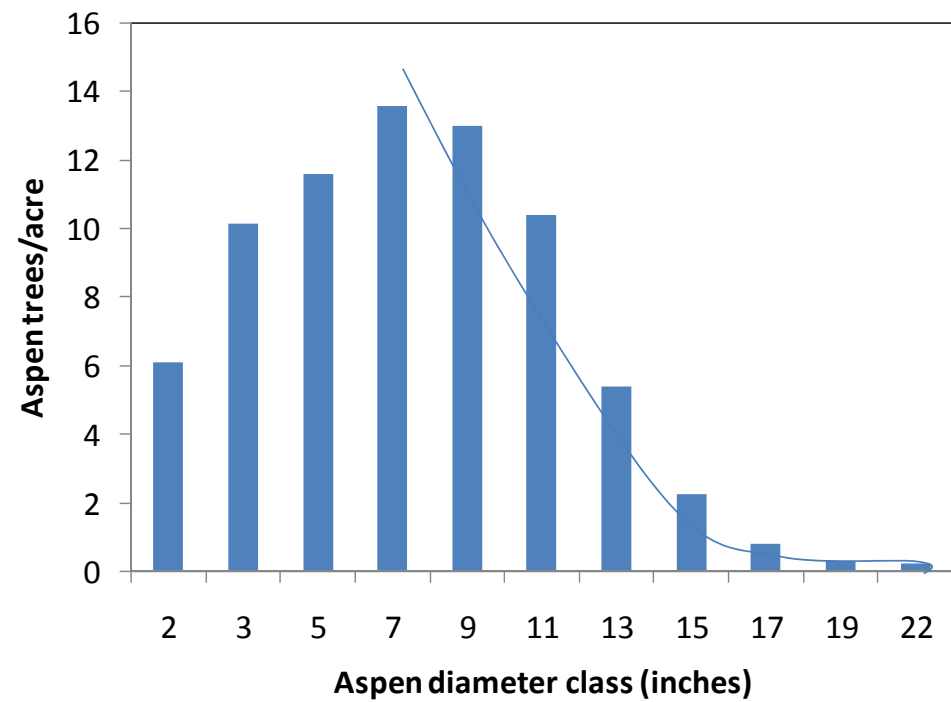


If we add the 0" size class (stems less than breast height) – there are HUGE numbers of aspen “waiting” for a chance to get above browsing risk

Here's the story told in tree size classes (rather than age)

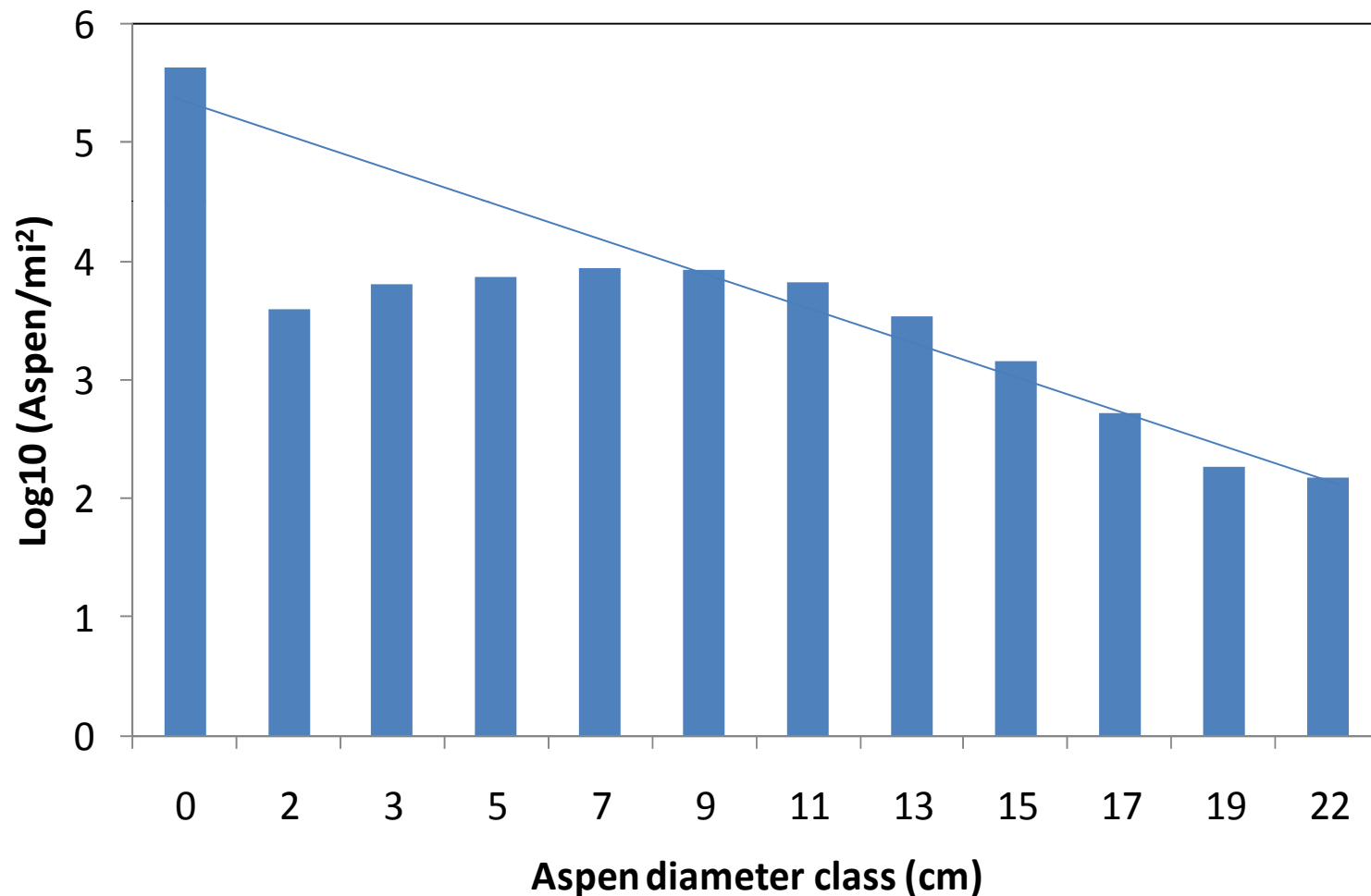


... the story is the same: lack of recent regeneration



If we add the 0" size class (stems less than breast height) – there are HUGE numbers of aspen “waiting” for a chance to get above browsing risk

We can make clearer sense of the pattern if we plot the *logarithm* of the number of aspen/acre (turns curves into lines). This shows that the current abundance of aspen shoots smaller than breast height would be enough to replenish the historical aspen population pattern -- if they were able to grow into trees



2. To what extent is browsing impact caused by cattle or by deer and elk?

Methods ... enclosures

Electric fence:
excludes cattle only
(2 sites)



Hard wire fence:
excludes cattle, elk, & deer
(14 sites)



2. To what extent is browsing impact caused by cattle or by deer and elk?

Results ...

- Too soon to tell for sure because the fences have been in place only for 1-2 years
- The study is continuing ... stay tuned ...



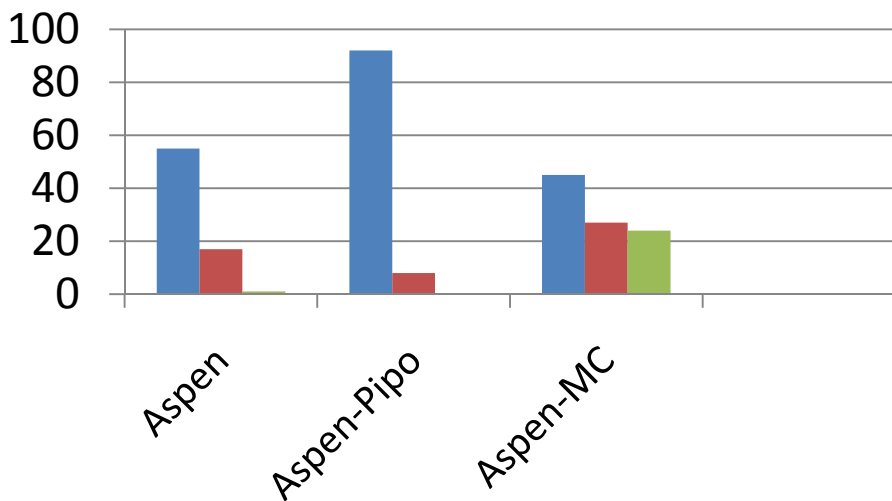
3. What is the spatial pattern of browsing impact across the Plateau, and are there any apparent explanations for the pattern?



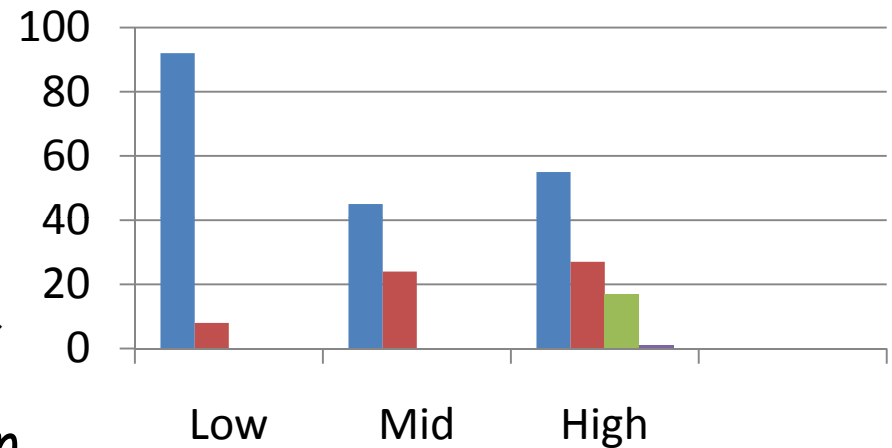
- This part of the study is still in progress
- Results to date indicate that the story is complex
- Some preliminary results ...

Browsing intensity during *summer 2010* (% aspen shoots browsed by ungulates) in seven sites across the UP

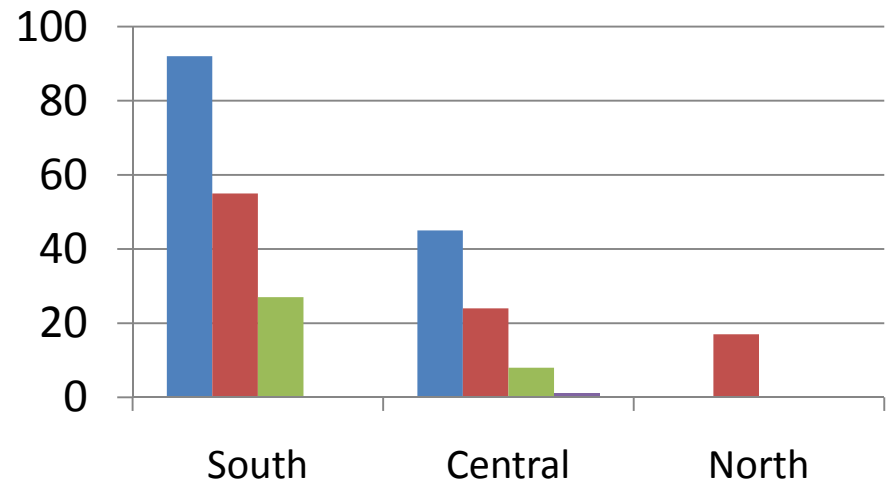
by Forest type



by Elevation →



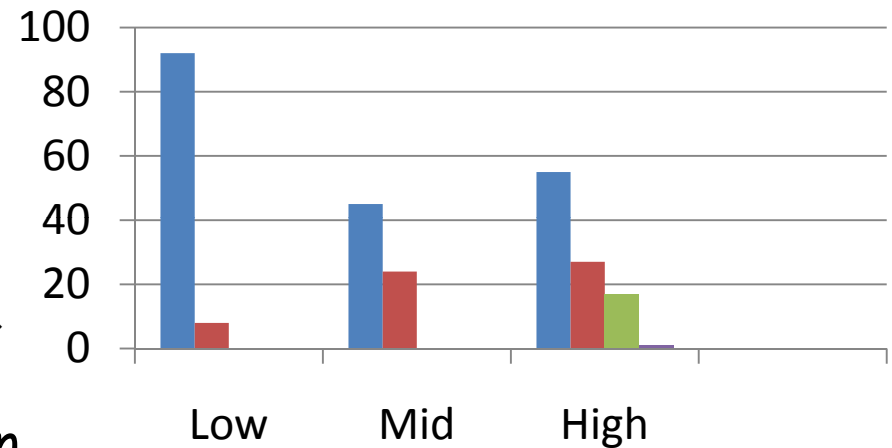
by Region ↘



Browsing intensity during *summer 2010* (% aspen shoots browsed by ungulates) in seven sites across the UP

*Lots of variability, but
 no clear patterns!*

by Elevation →

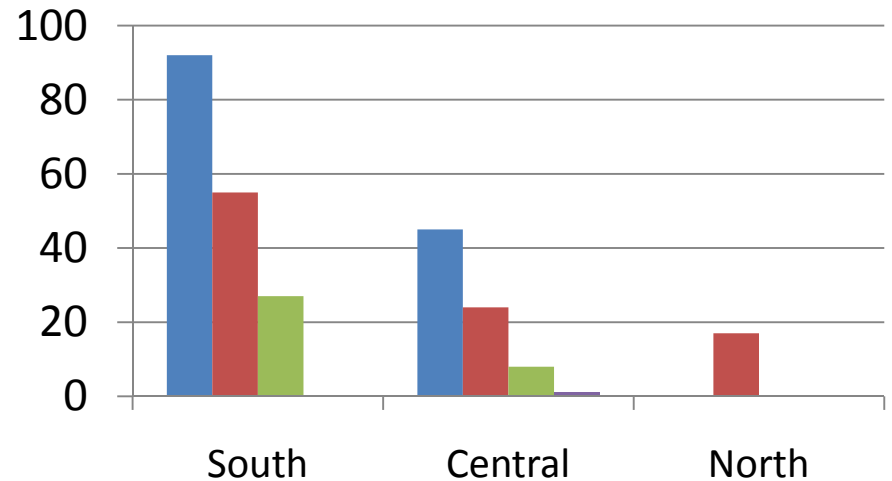
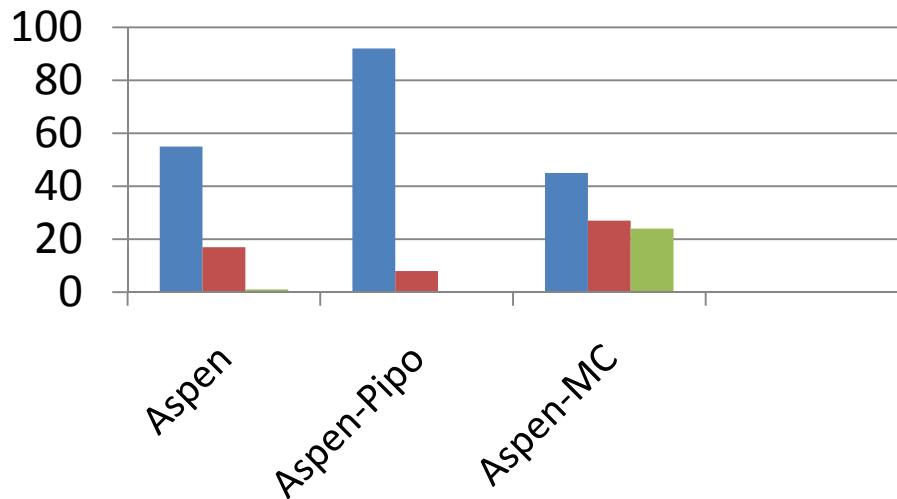


by Forest type

↓

by Region ↘

↘



- Maintain the existing exclosure fences ... and add one or more electric fences (to exclude cattle only) if possible
- Measure browsing intensity at all experimental sites in early summer and late fall 2011 (to document winter and summer browsing, respectively)
- Measure height of aspen shoots inside & outside of exclosures in 2011 & 2012 to document growth rates with and without browsing
- Complete analyses of spatial patterns
- Initiate a new study of the influence of SAD and post-harvest coarse wood on aspen regeneration in the Wolverine sale (harvested 2010)

Next Steps



