

Participants: Andrea Marcon, Harmony Dalglish, Nate Litchti

Because the preceding LANDIS-II meeting an Herbivory discussion group already pointed out the main topics to deal with ([here](#)), we decided to take the first steps towards modifying the BDA extension to simulate the browsing effect.

We started considering three big topics:

- 1- Food preferences: Ungulates have species preferences affecting their choice and (and resulting impacts) on juvenile trees
- 2- Population dynamic: Temporal Changes in Abundance; Spatial Distribution and/or Change in Abundance
- 3- Herbivory effects: Mortality, Establishment, Suppression

Modeling proposals:

- 1- Food preferences
  - a. Modified establishment probability, based on species-specific food preferences of the ungulate species
- 2- Population dynamic
  - a. Ungulate-region map, accounting for different ungulate species distribution and overlap, and cumulative effect on vegetation
  - b. Population considered to be stable across the simulation. Natural fluctuation modeled by random fluctuation around a mean and within a range, both parameters should be user defined
  - c. Seasonal movement will be accounted for in the Ungulate-region map, as long as LANDIS-II has a longer time step. A dynamic Ungulate-region map could be developed hereafter
- 3- Herbivory effect
  - a. Affected areas selected by a combination of Ungulate-region map and Site Resource Dominance, the least modified from BDA for focusing on youngest cohorts abundance

Next steps

- 1- Develop an ungulate extension that model the impact on biomass instead of on cohort. That would account for loss in biomass during suppression events, i.e. the tree survives but grows up much slowly
- 2- Develop a dynamic ungulate map that will consider the seasonal movement, from vertical migration (changing in elevation) to wide range migration (es. bison)

- 3- Develop a feed-back module, so the time-changing characteristic of the forest will determine where (and how) the ungulates concentrate their effect.