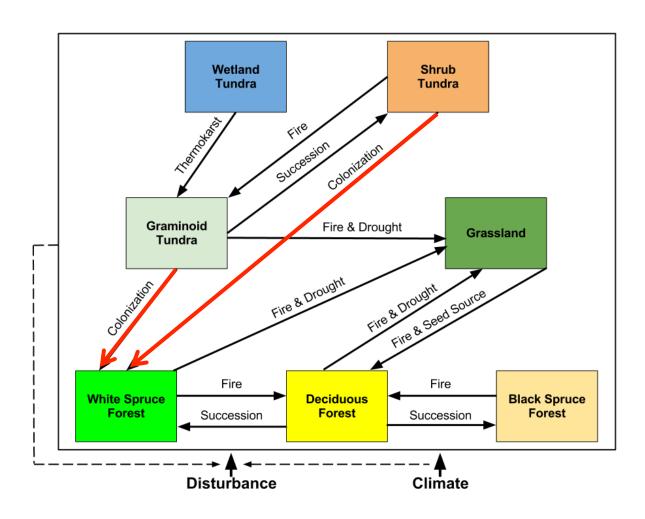


ALFRESCO state transitions



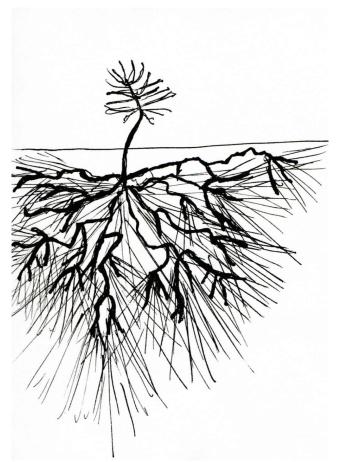
Conceptual diagram of the processes affecting state transitions in ALFRESCO. Arrows indicate causal relationships (Breen et al. 2013, Gray et al. 2013)

Seedling Recruitment

- Seedling recruitment -> changes in species distributions
 - Dispersal
 - Establishment
 - Growth
- Fire hypothesized to facilitate treeline expansion
 - Kills plant competitors
 - Opens up high-quality microsites
 - E.g., Fire linked to lodgepole pine migration and tundra shrub expansion

EMF-seedling interactions

- Ectomycorrhizal Fungi (EMF)
 - Conduits of soil nutrients and water
 - Pathogen resistance
 - Facilitate establishment and growth



Fire effects on EMF

- Fire severity
 - Combustion of soil
 - Kills host plants

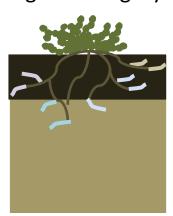
Low severity

Low combustion

Low host plant death



High EMF legacy



High severity

High combustion

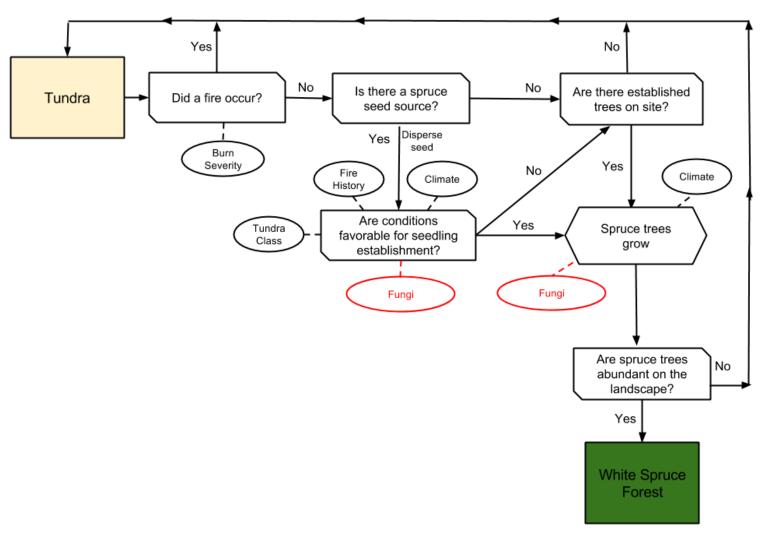
High host plant death



Low EMF legacy



EMF-seedling interactions inform model



Conceptual diagram of the processes affecting state transitions from tundra to spruce in ALFRESCO. Arrows indicate the progression from one step in the transition process to the next step in the process. Figure modified from work by the ALFRESCO 2.0 Team (Breen et al. 2013, Gray et al. 2013)

EMF-seedling interactions modify establishment and growth

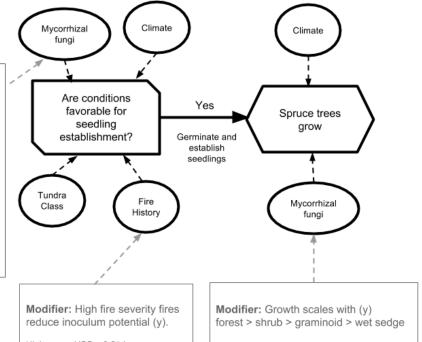
Inoculum potential (y) of tundra classes:

Wet sedge tundra: y=0.01 Graminoid tundra: y=0.25 Shrub tundra: y=0.75 Forest y=1.0

Check: random number generated (x) and compared to vegetation class inoculum potential (y). If $x < y \rightarrow$ seedlings establish

Modifier: seed:seedling scales with (y). Fewer seeds are required to produce one seedling in forest.

forest < shrub < graminoid < wet sedge



High crown-HSS =0.2(y)

High crown- LSS = 0.5(y)

Moderate, Low, Unburned = 1.0(y)