Hitchhiker planting:
An alternative deployment strategy for ensuring the establishment of desirable native herbaceous species on disturbed industrial sites

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Purpose for today's presentation

This presentation will:

1. Overview the basic premises and motivations for hitchhiker planting
2. Considerations when growing mixed-species container stock in a nursery
3. Early findings from a range of ongoing field studies that are evaluating this approach.

Motivations to hitchhike – part 1

- Native herbaceous plants may provide protection for shade-tolerant woody species and create desirable native vegetation cover, allowing for natural ingress of understory species that require protection.
- Native herbaceous plants may also provide a barrier to invasion of weedy species by occupying physical space (above and below-ground).

Motivations to hitchhike – part 2

- Establishment of native herbaceous species on reclaimed industrial sites can be challenging as reliance on natural recovery is not consistent and intentional deployment is often limited by a lack of accessible seed and plant propagules.
- Incorporating or ‘hitchhiking’ native forbs into the same nursery container as a shrub or tree is a potential means of efficiently establishing native forbs on a disturbed site.

Motivations to hitchhike – part 3

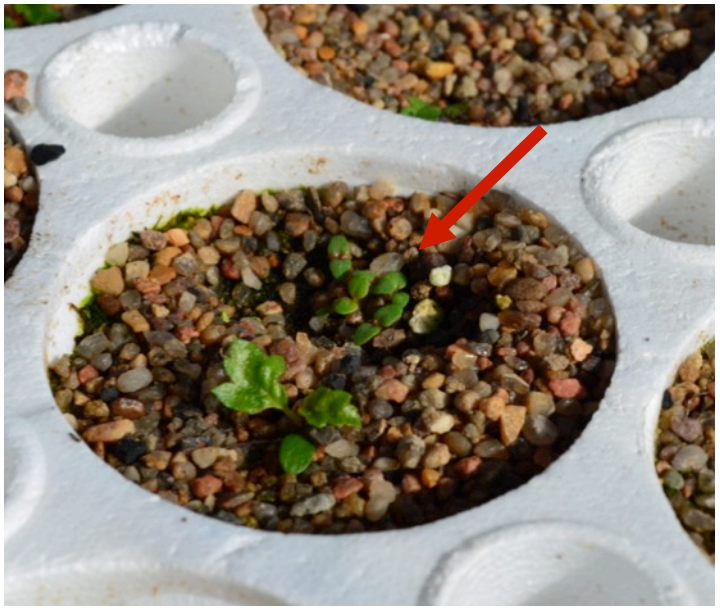
- Hitchhiking = sowing 2 plant species into a single container (plug).
- One plant gets a free ride – 2 for 1 planting in the field.
- This could be a more cost-effective approach but this will be dependent upon the relative cost-difference of growing larger container stock as well as differences in field performance.

BUT.....

How do we grow hitchhiker container stock????

Nursery production of hitchhiker stock

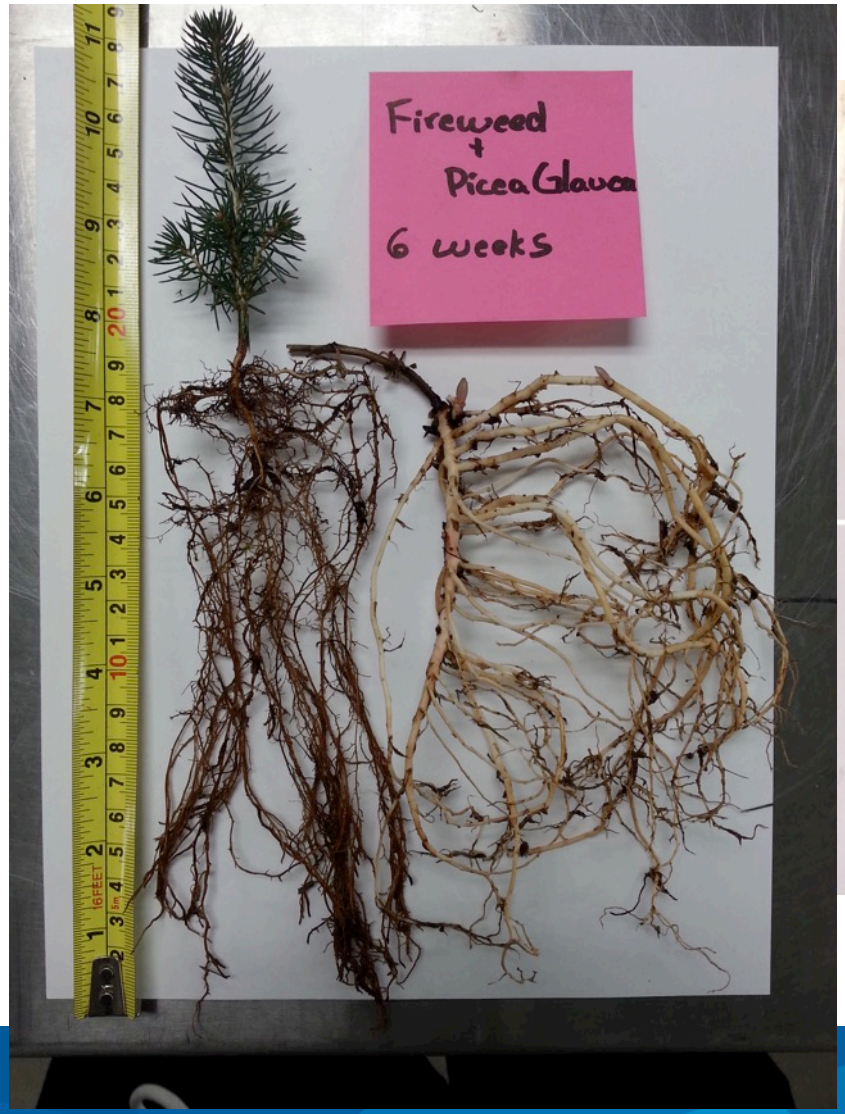
- Often grit has been placed following sowing of 1 species – an opening must be made for the hitchhiker species.



Nursery production of hitchhiker stock

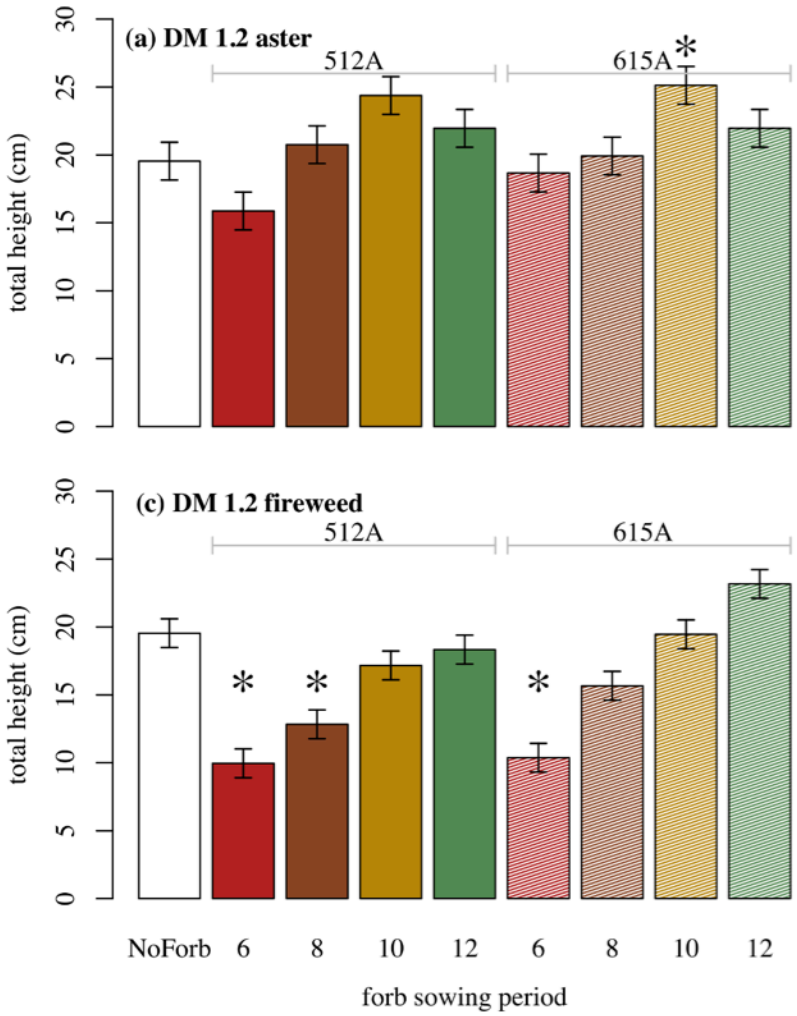
- Timing of the sowing is critical to successfully obtaining 2 healthy plants, this timing varies by species mixture.

Nursery production of hitchhiker stock



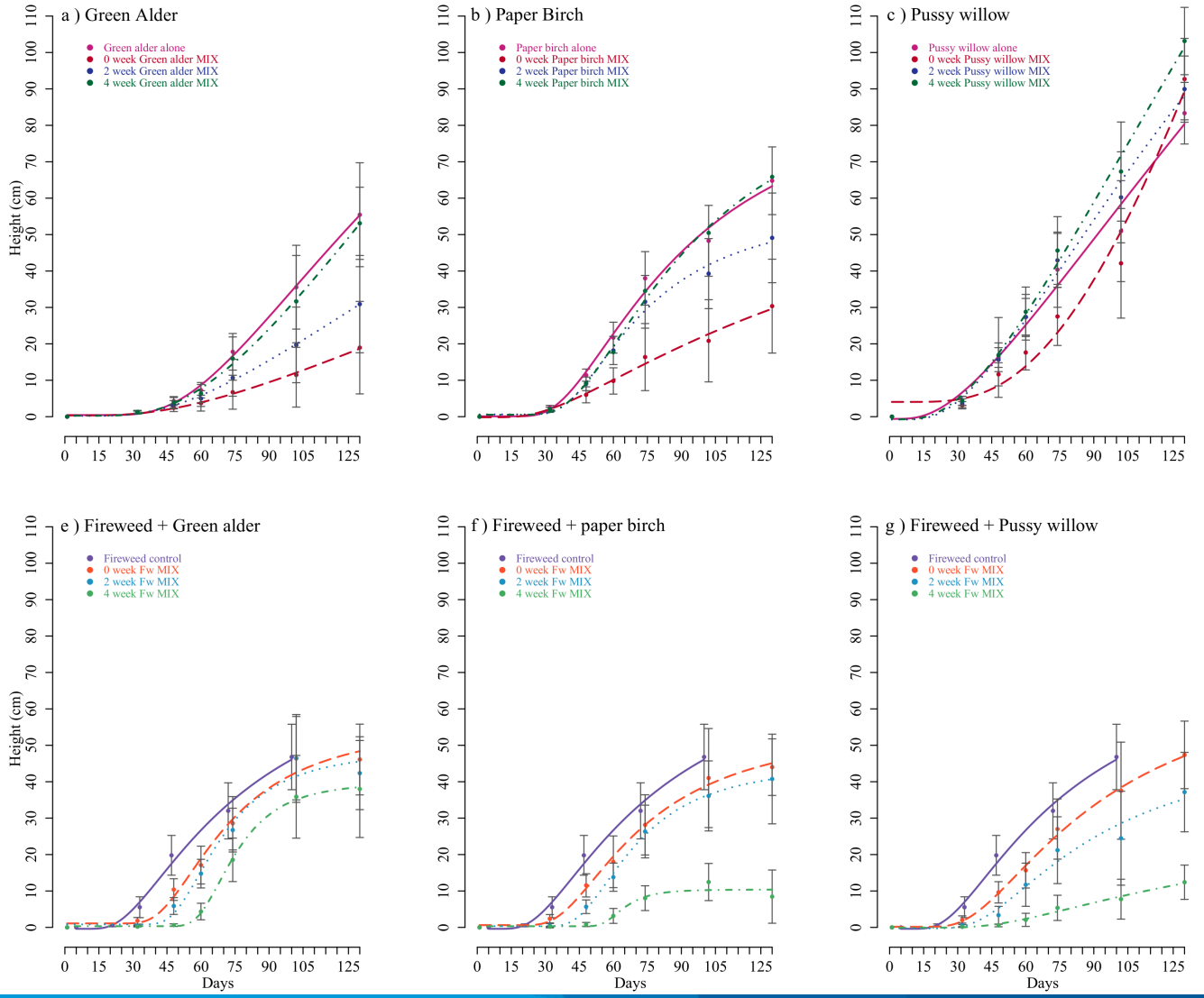
Nursery production of hitchhiker stock

Importance of timing: need to find balance in growth between species



Nursery production of hitchhiker stock

Importance of timing: more critical when mixing two fast-growing species



Nursery production of hitchhiker stock

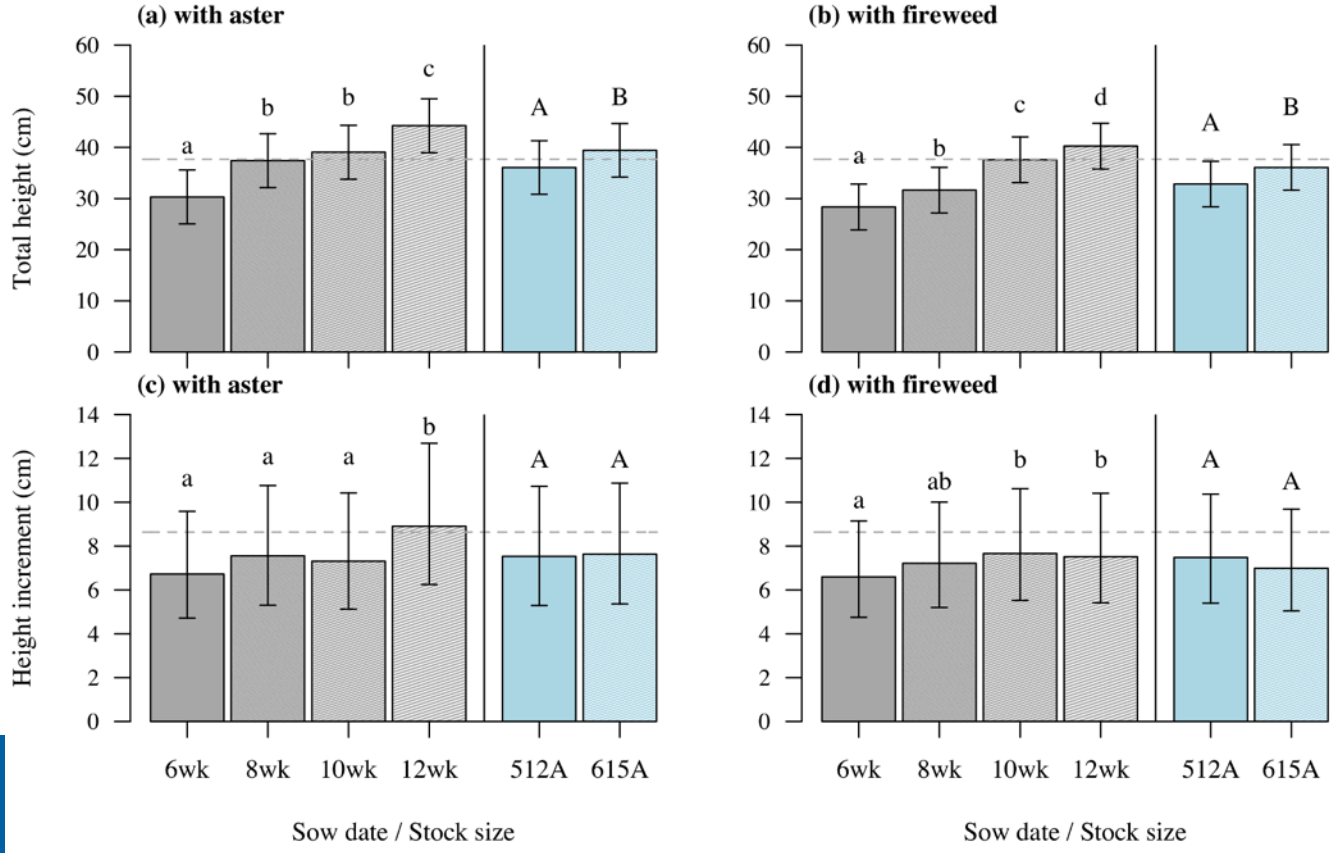
Importance of timing: more critical when mixing 2 fast-growing species

June 10

July 7

What happens when the stock is planted?

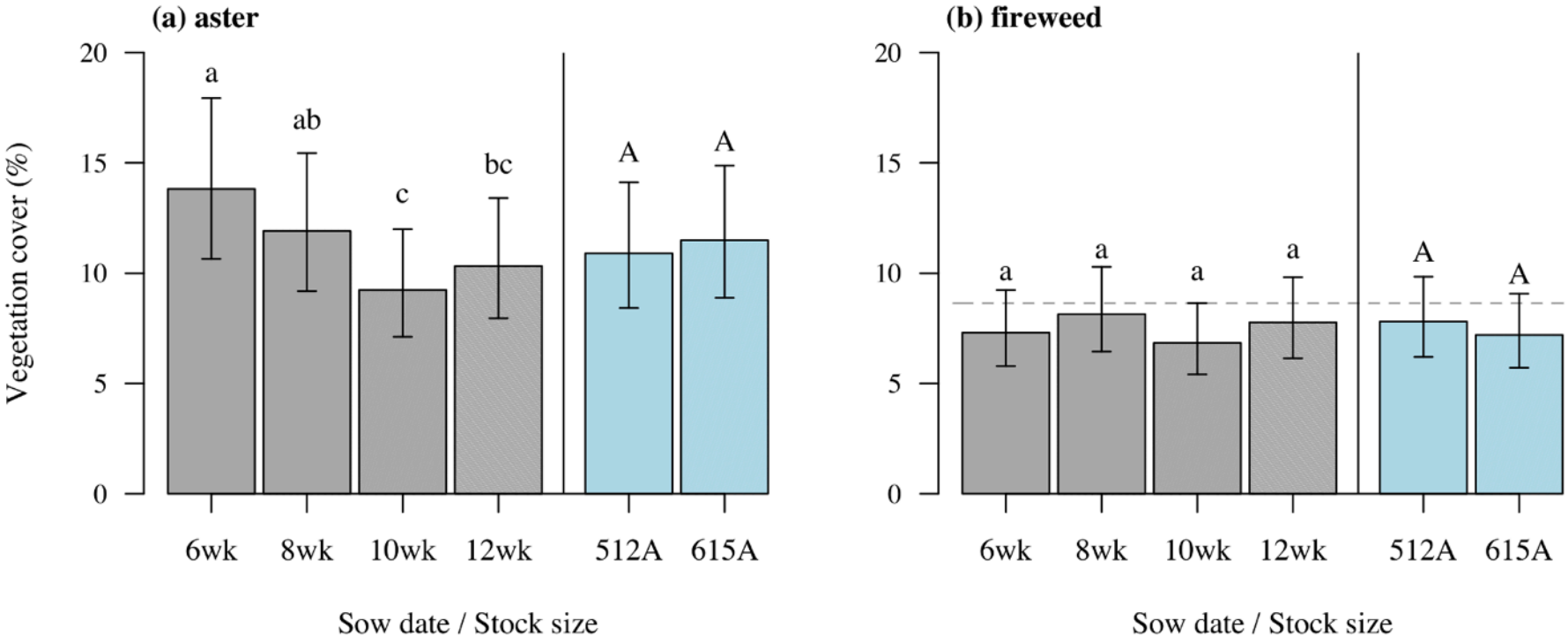
Results below: preliminary analysis after 3 growing seasons across five widely varying reclaimed industrial sites. Total height and height increment (3rd growing season) of white spruce (*Picea glauca*) grown with different forbs.



*ASTER – *Eurybia conspicua* *Fireweed – *Chamerion angustifolium*

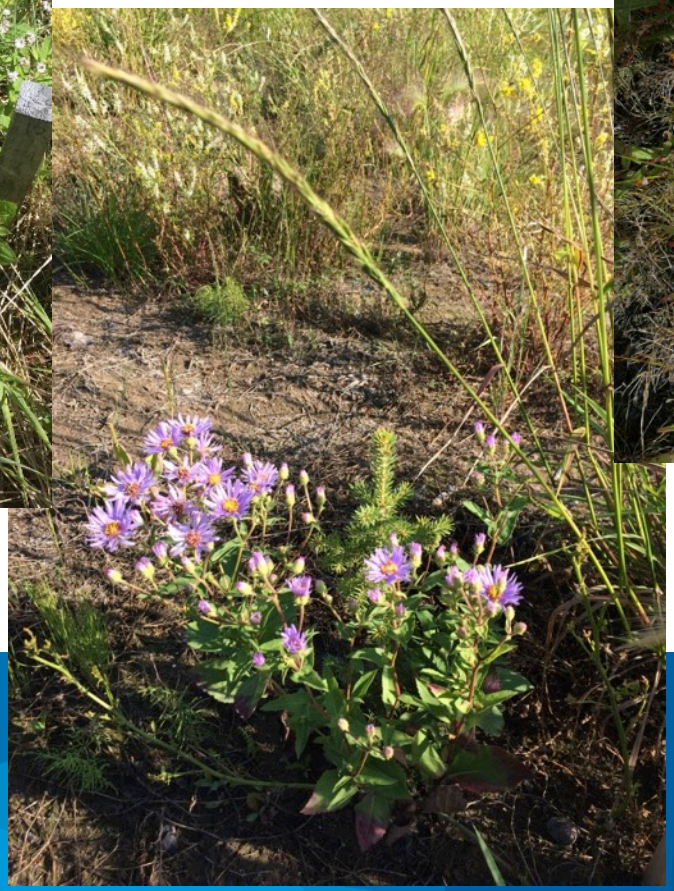
What happens when the stock is planted?

Results below: preliminary analysis after 3 growing seasons across 5 widely varying reclaimed industrial sites. Vegetation cover estimate based on 0.5 x 0.5 m quadrat centered on white spruce (with which these forbs were hitchhiked)



*ASTER – *Eurybia conspicua* *Fireweed – *Chamerion angustifolium*

Species mixtures: white spruce with showy aster (*Eurybia conspicua*)



Species mixtures: white spruce with fireweed (*Chamerion angustifolium*)

Species mixtures: Pussy willow (*Salix discolor)* with fireweed

Species mixtures: White spruce with goldenrod (*Solidago canadensis*)

Species mixtures: Paper birch (*Betula papyrifera)* with fireweed

Concluding remarks (1)

- Hitchhiking native plant species in the same nursery container and out planting on a range of reclaimed sites in northern Alberta has so-far been largely successful in the sense that we have consistently observed establishment of both species.

- As illustrated, timing the introduction of the forb into the nursery container with the woody species is important:
  - Hitchhiking with slower-growing species (white spruce) provide a wider window to introduce the forb.
  - Combining a fast-growing species (many deciduous species) with fireweed (we have not tested other forbs yet) has a much narrower window.

Concluding remarks (2)

- Field out-planting considerations:
  - There are differences in the success of establishment of the forbs depending on site conditions.
    - Fireweed appears to be more sensitive to soil type and competing vegetation than showy aster or goldenrod.
  - Spring versus fall planting should be evaluated further.
    - We have observed differences across studies that might be driven by this.
- Choice of species mixtures will be driven by management objectives:
  - To increase diversity?
  - Protection of woody species?
    - Showy aster and goldenrod develop in a large clump surrounding the woody plant while fireweed tends to egress out quickly.
  - Fast occupancy of growing space?
    - Fireweed and potentially goldenrod would be suitable candidates but showy aster does not spread as fast.

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