(12 min)

Severe forest fire in Alaska and global environmental changes

The establishment patterns of tree seedlings after severe forest fire in interior Alaska

アラスカ内陸部大規模森林火災後の木本実生定着パターン

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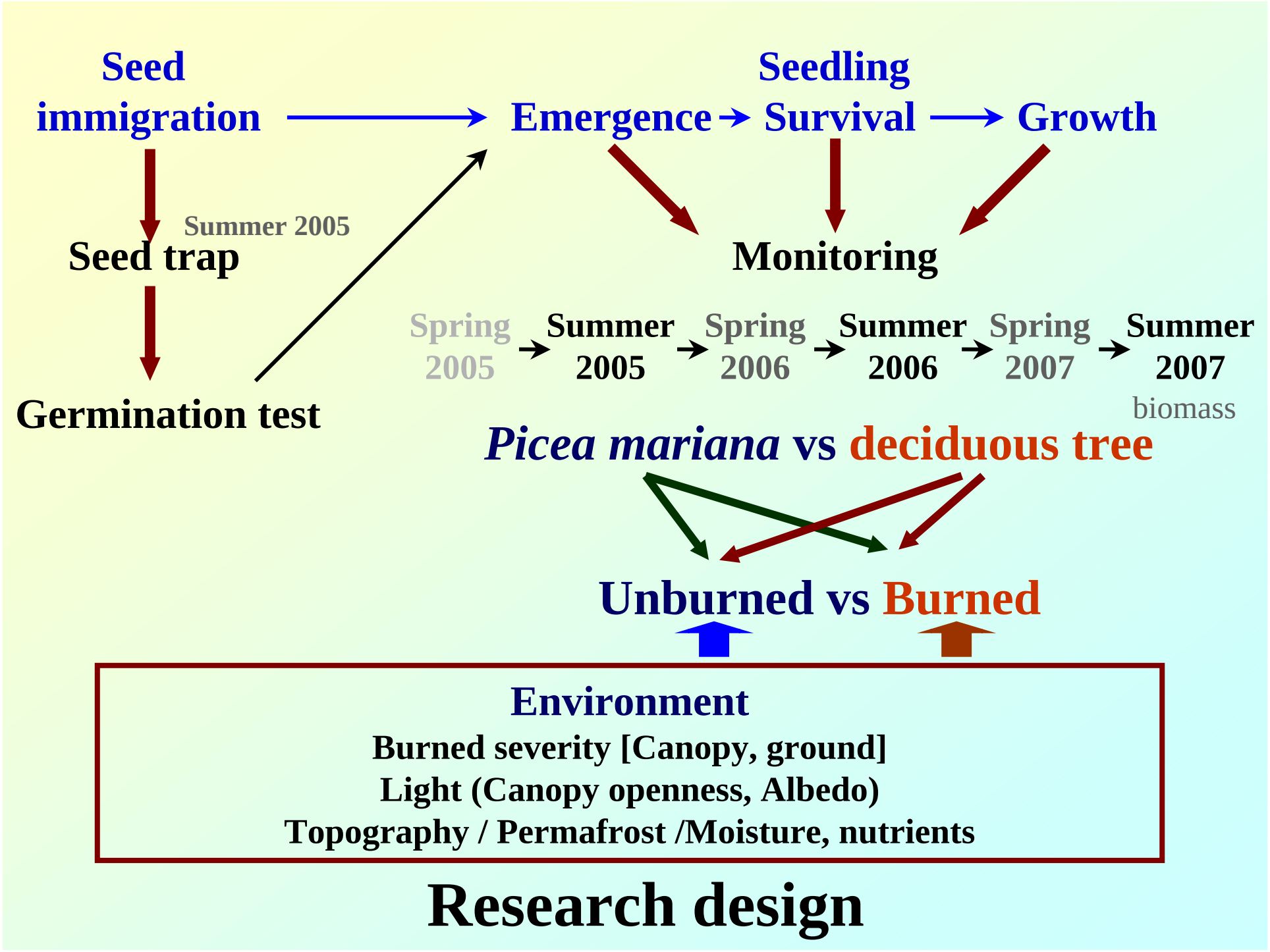


Research design

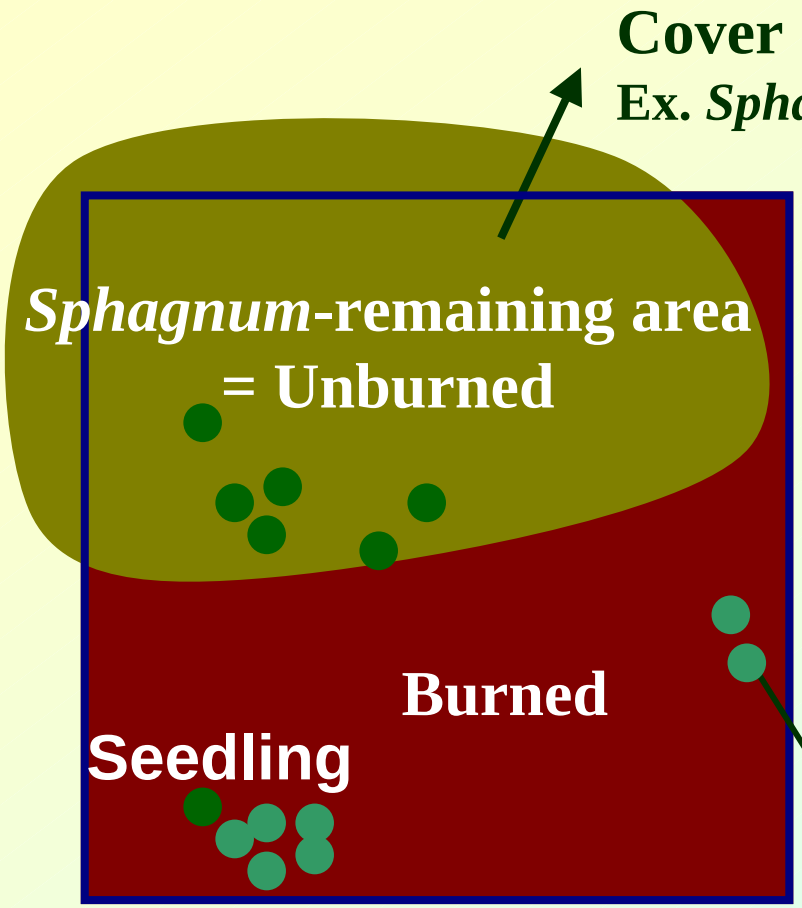
Plant (*Sphagnum*)-remaining area **Burned area**

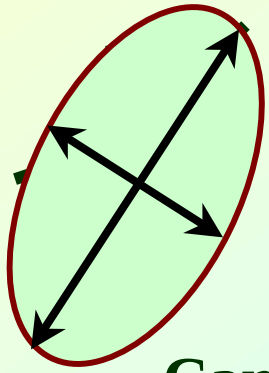
Fire severity	Less	Moderate	Severe
Burned area (%)	3-30	50-87	90-100
P. mariana survival (%)*	63-92	0-10	0
Duff layer (cm)	37-50	37-67	11-39

*: Stem > 1.3 m in height

Taxa	Species
Tree	4
Shrub	13
Herb	12
Fern	2
Moss	10
Lichen	2+

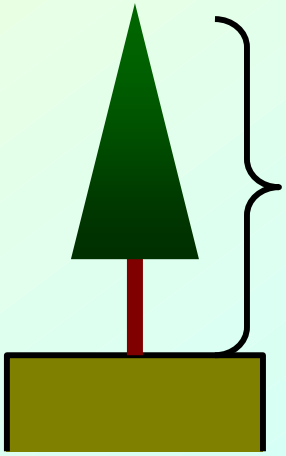
Ground surface on surveyed plots





Canopy area

From Above



From the side

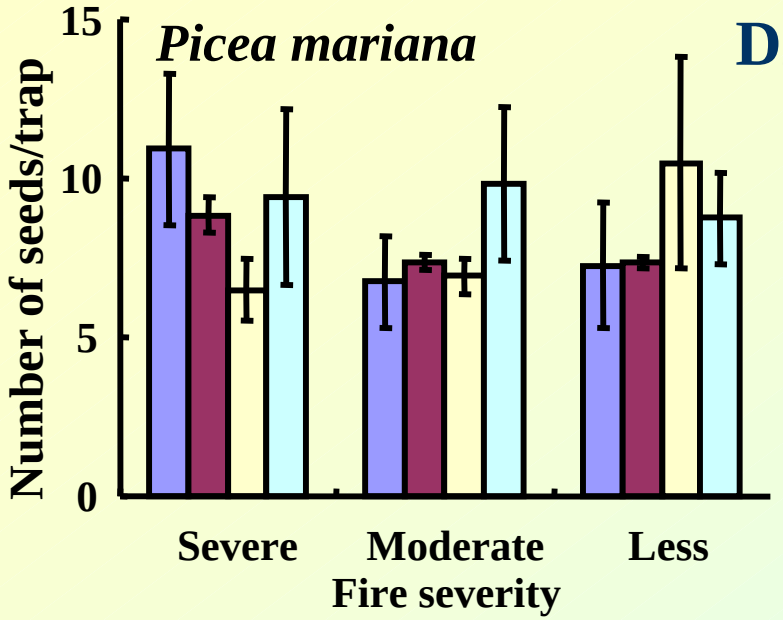
Habitat (Burned/Unburned)
Survival
Stem height
Canopy area

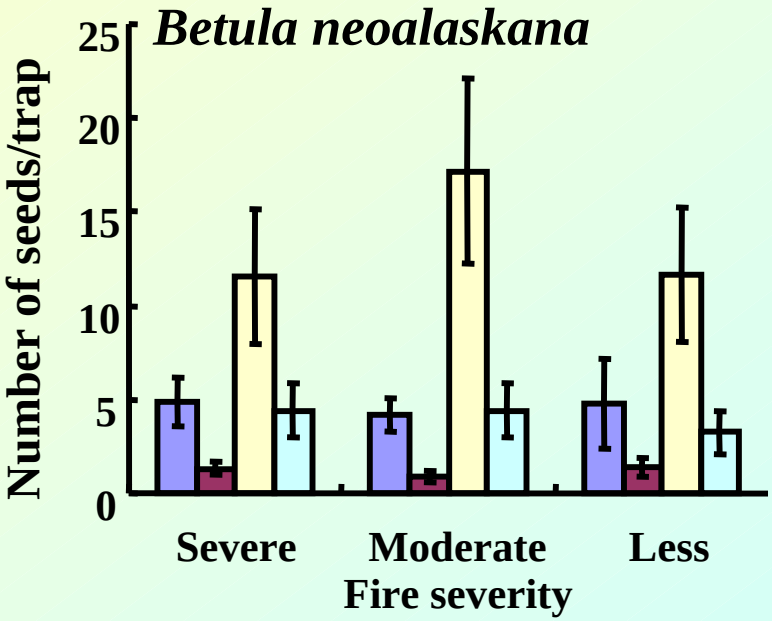
96 1 m × 1 m quadrats established in less, moderate and severe-burned areas

Monitoring on vegetation and seedling

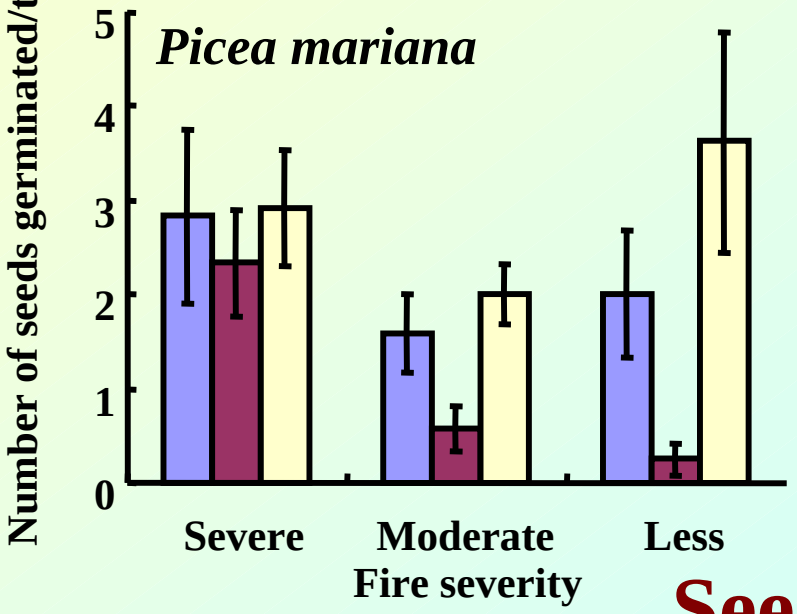
Life form	Species	Habitat					
		Unburned			Burned		
		2005		2006	2005		2006
Tree	*Pieca mariana*	1.6	=	1.6	0.1	=	0.1
	Betula neoalaskana	-	=	+	+	<	0.8
	Populus tremuloides	-	=	+	+	<	0.3
Shrub	*Ledum groenlandicum*	8.6	<	11.6	1.9	<	2.6
	Vaccinium vitis-idaea	3.9	<	5.4	0.3	=	0.5
	Vaccinium uliginosum	3.9	<	4.6	1.4	<	1.8
Herb	*Carex bigelowii*	4.0	=	4.1	0.7	=	0.9
	Calamagrostis canadensis	1.1	=	1.2	1.8	<	3.8
	Epilobium angustifolium	+	=	+	2.8	<	4.7
Moss	*Sphagnum* spp.	79.7	=	79.1	0.6	<	1.1
	Polytrichum strictum	2.7	=	2.5	0.7	=	0.9
	Ceratodon purpureus	+	=	+	2.5	<	7.3

Yearly changes in cover





Germination

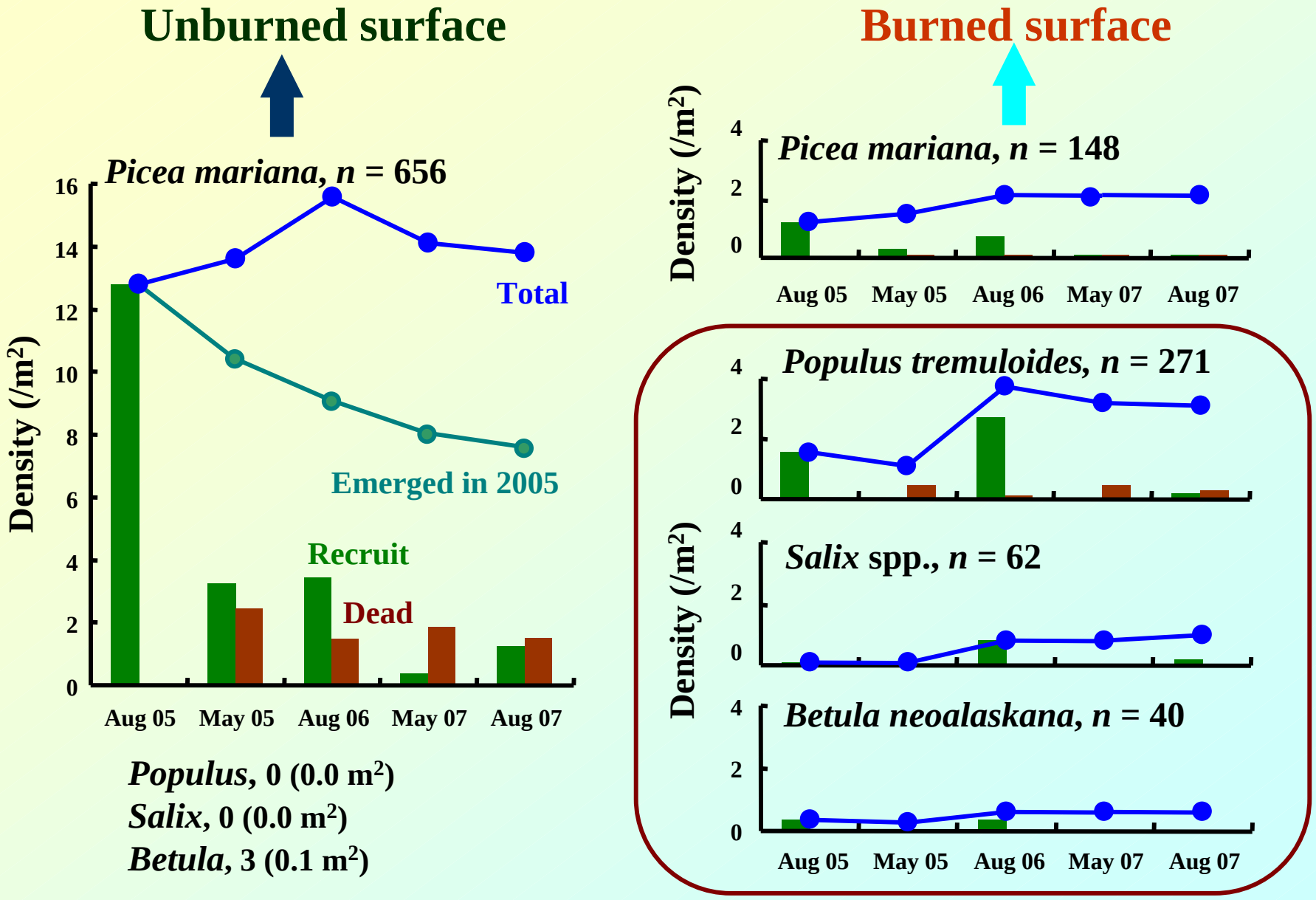


Summer 2005-spring 2006
Spring 2006- summer 2006
Summer 2006-spring 2007
Spring 2007-summer 2007

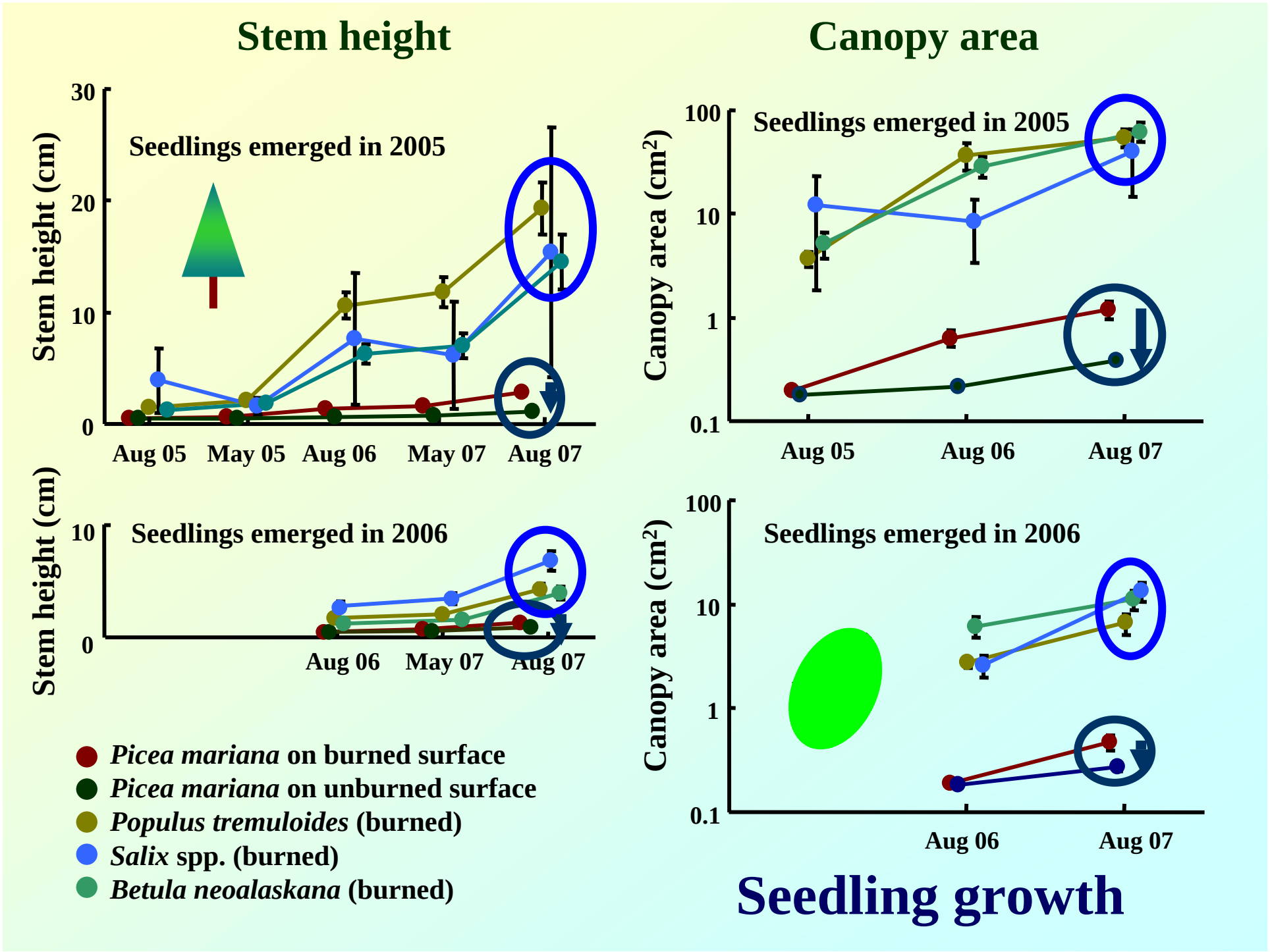
Surface area of seed trap
= 52 cm × 26 cm

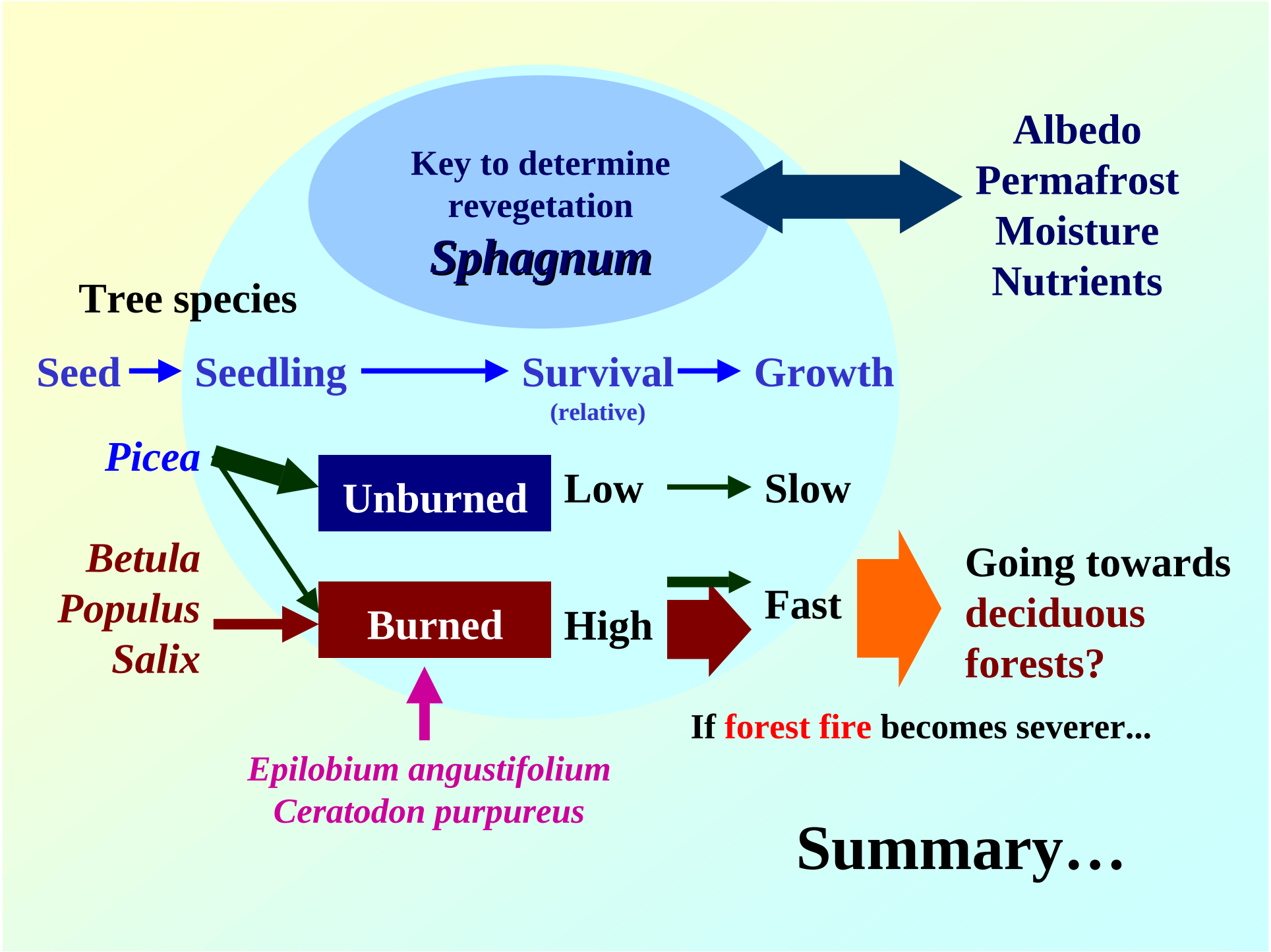
Mean numbers of seeds and seedlings per trap are shown with SE.

Seed dispersal and germination



Tree seedling emergence and survival on burned and unburned surfaces from 2005 to 2007


Stem height
Canopy area
Seedlings emerged in 2005
Seedlings emerged in 2006
Stem height (cm)
Canopy area (cm²)
30
20
10
0
100
1
0.1
Aug 05
May 05
Aug 06
May 07
Aug 07
Picea mariana on burned surface
Picea mariana on unburned surface
Populus tremuloides (burned)
Salix spp. (burned)
Betula neoalaskana (burned)
Seedling growth


Key to determine revegetation
Sphagnum
Albedo
Permafrost
Moisture
Nutrients
Tree species
Seed
Seedling
Survival
(relative)
Growth
Picea
Unburned
Low
Slow
Betula
Populus
Salix
Burned
High
Fast
Going towards deciduous forests?
If forest fire becomes severer...
Epilobium angustifolium
Ceratodon purpureus
Summary…