

# Myklandsbrannen 4 år etter

Per Holm Nygaard, Norsk institutt for skog og landskap

Kartlegging av margborerangrep etter skogbrannen i Mykland i 2008.

Survey of pine shoot beetle (*Tomicus*) attacks after a forest fire in Mykland in 2008

Peder Magnus Magnussen



Effects of forest fire on production of down woody debris in Aust-Agder County in Norway.

Synne Marie Vestmoen



**Roald Brean**

**«Ilden forvandler seg til alt,  
og alt forvandler seg til ild»  
Heraklit 500 f. Kr.**

**Foto : Paul Mjåland**



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and co

PROFESSIONAL DESIGN AND  
LANDSCAPE ARCHITECTURE

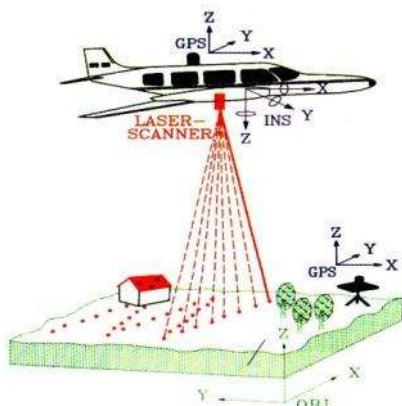


Foto : Paul Mjåland





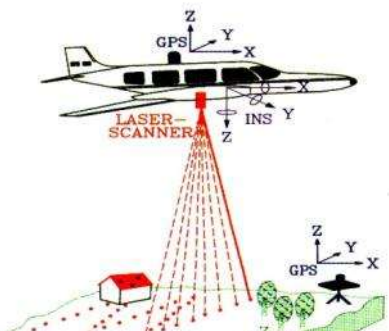
LASER-SCANNING



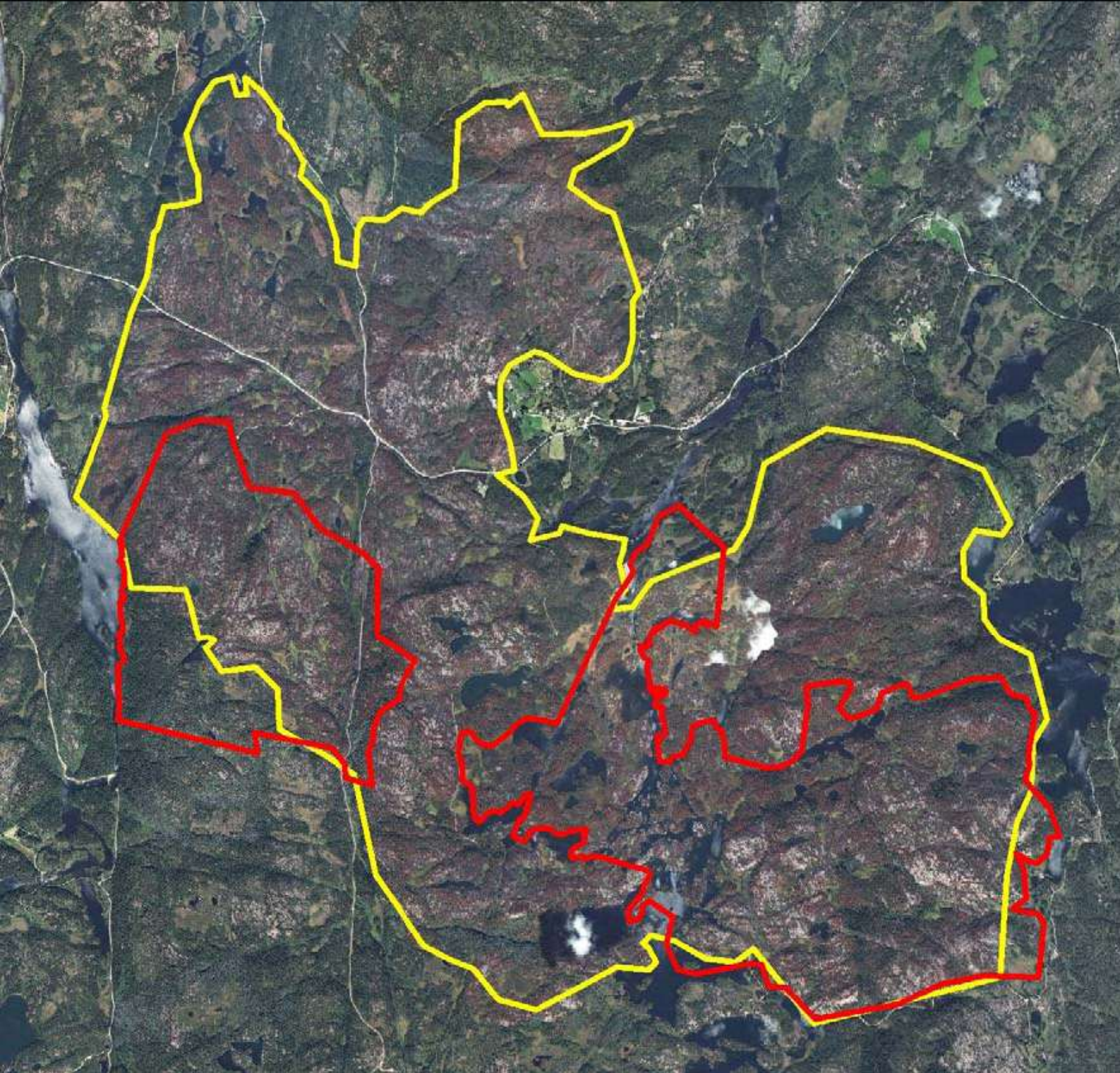
**+ ORTOFOTO 2007**



LASER-SCANNING



**+ ORTOFOTO 2009**



Brannomr\_mykland\_u32.shp

Brannomr\_mykland\_u32\_eras.e.shp

919\_hoyde\_lin.shp

Bergartflate\_f32.shp

- 1 - Løsmasser
- 2 - Sandstein
- 3 - Konglomerat, sedimentær breksje
- 4 - Breksje
- 5 - Mylonitt, fyllonitt
- 7 - Sedimentære bergarter (uspesifisert)
- 8 - Skifer, sandstein, kalkstein
- 9 - Sandstein, skifer
- 10 - Kalkstein, skifer, mergelstein
- 11 - Kalkstein, dolomitt
- 21 - Granitt, granodioritt
- 22 - Dioritt, monzodioritt
- 23 - Syenitt, kvartssyenitt
- 24 - Monzonitt, kvartsmonzonitt
- 25 - Mangerittsyenitt
- 26 - Ryolitt, ryodacitt, dacitt
- 27 - Rombeporfyr
- 28 - Metabasalt
- 29 - Vulkaniske bergarter (uspesifisert)
- 30 - Mangeritt til gabbro, gneis og amfibolitt
- 35 - Gabbro, amfibolitt
- 37 - Keratofyr
- 38 - Kvartsdioritt, tonalitt, trondhjemitt
- 40 - Olivinstein
- 41 - Eklogitt
- 45 - Anortositt
- 46 - Charnokittiske til anortosittiske dypberg
- 50 - Amfibolitt og glimmerskifer
- 55 - Grønnstein, amfibolitt
- 60 - Metasandstein, skifer
- 61 - Kvarstitt
- 62 - Glimmergneis, glimmerskifer, metasand
- 65 - Fyllitt, glimmerskifer
- 66 - Kalkglimmerskifer, kalksilikatgneis
- 70 - Marmor
- 71 - Dolomitt
- 82 - Diorittisk til granittisk gneis, migmatitt
- 85 - Øyegneis, granitt, foliert granitt
- 87 - Båndgneis (amfibolitt, hornblendegneis, c

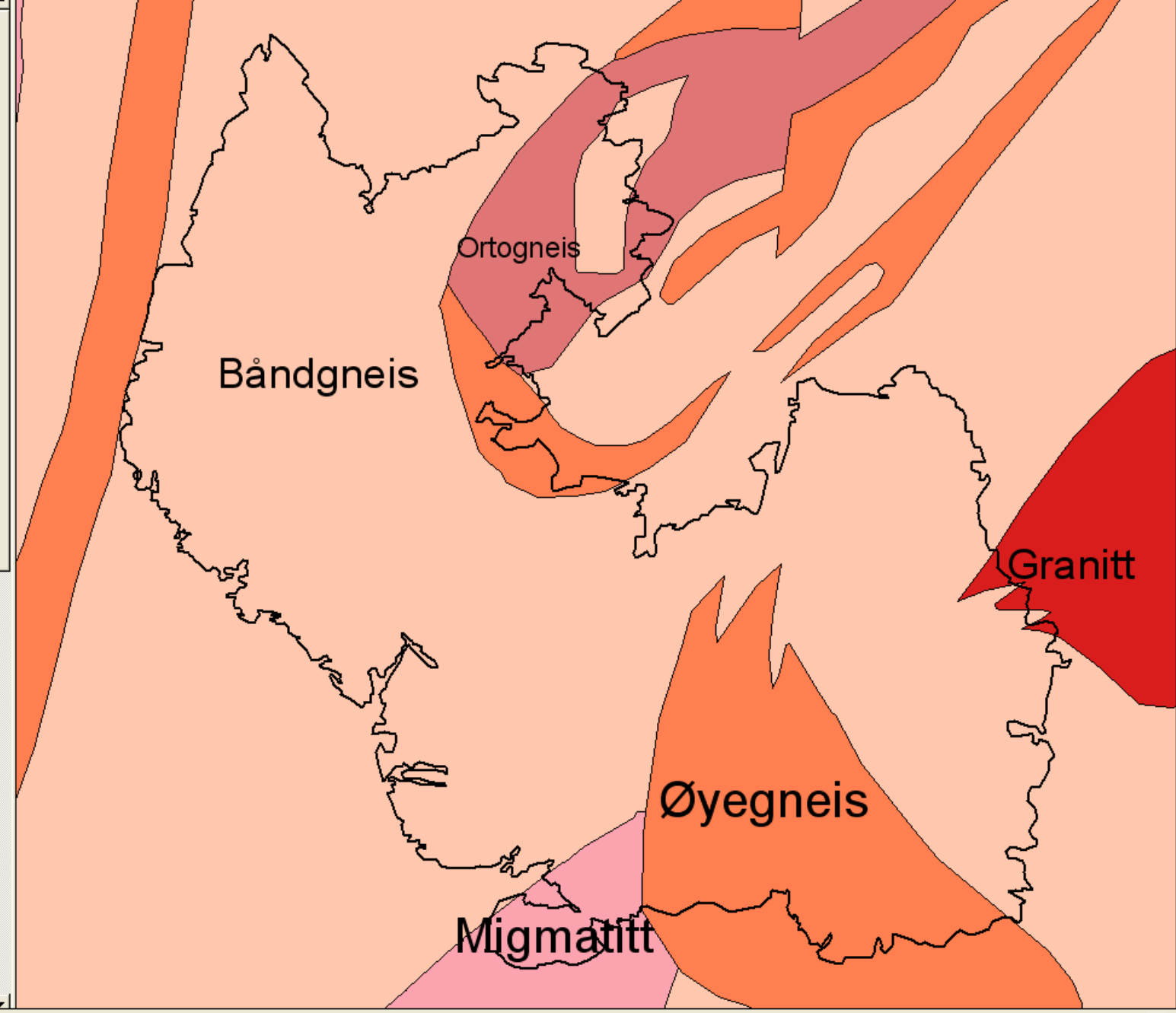
Eksport:27845-aa.jpg

919\_samferdsel\_lin.shp

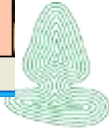
Koblamyk\_utm32.shp

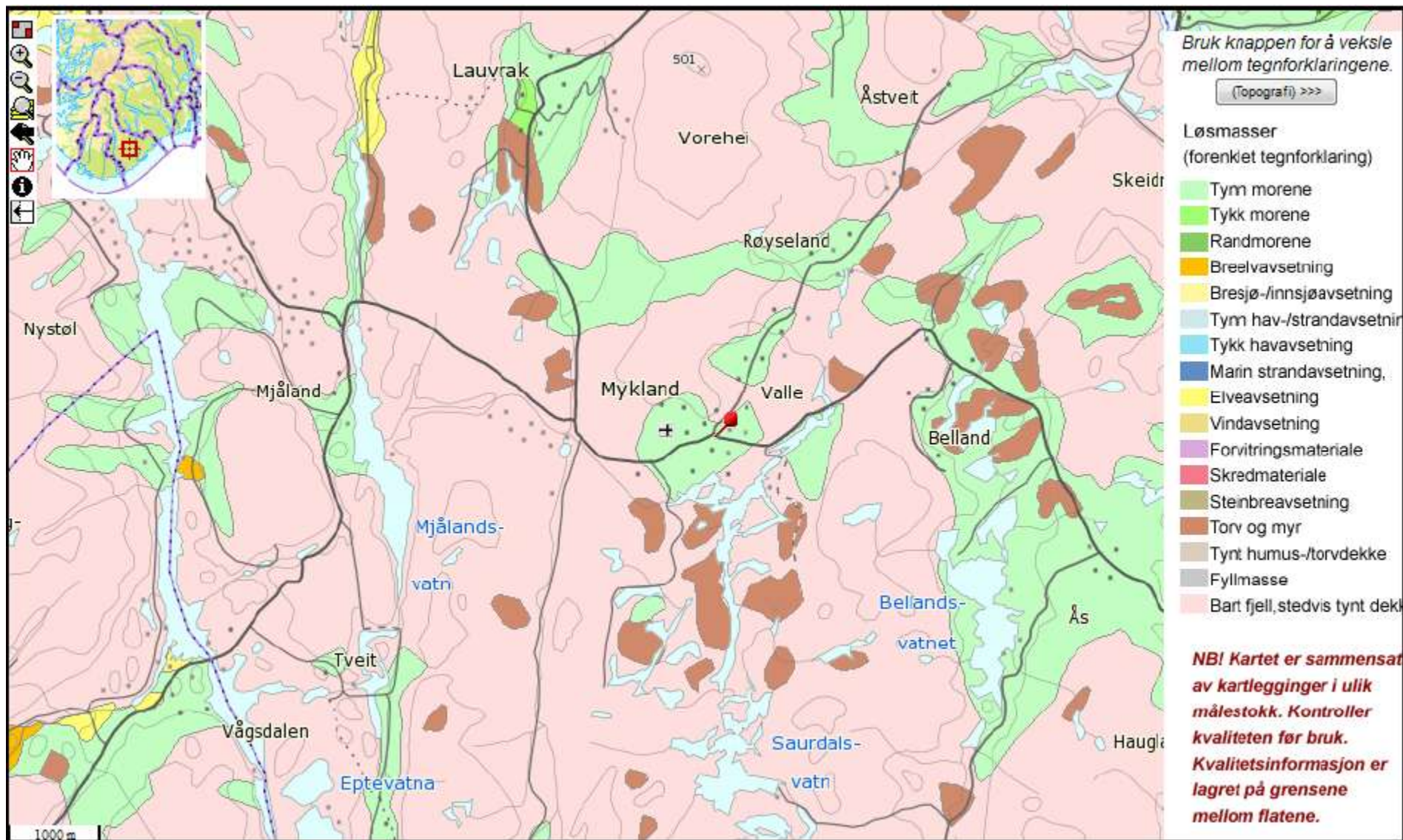
Brannomr\_mykland\_u32\_eras.ev.shp

919\_samferdsel\_pnt.shp



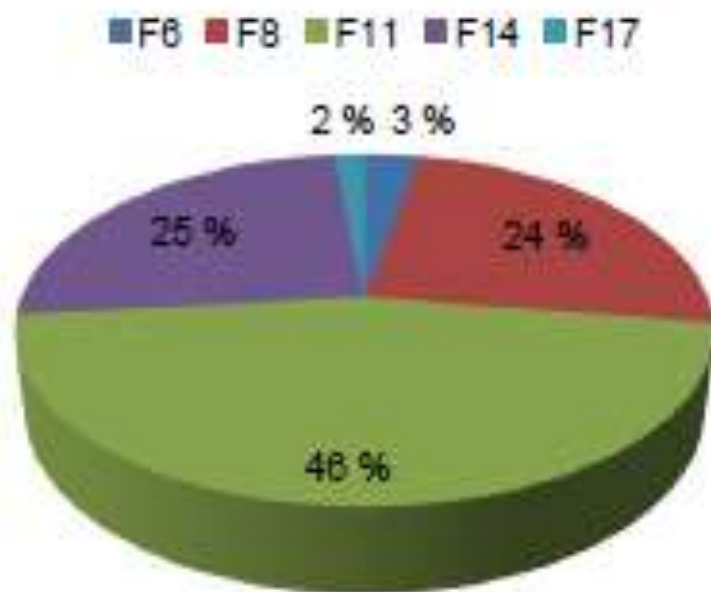
ArcView GIS 3.3



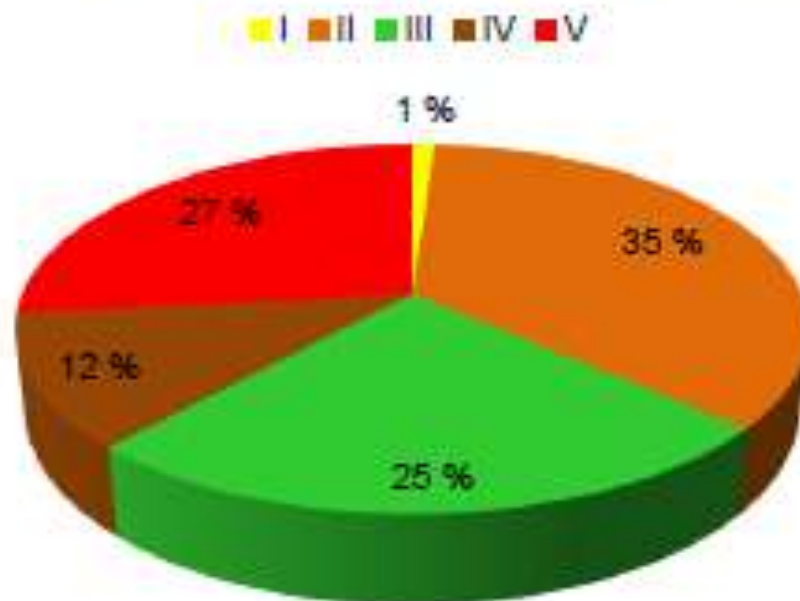




Prosentvis dekning for ulike boniteter



Prosentvis dekning for ulike hogstklasser



## Data fra AT-SKOG





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# **Ulike treslag har ulik toleranse for varme**

## **Tre hovedtyper skade**

**Skade på kambiet**

**Skade på bar og løv**

**Skade på rotsystemet**

## **Kritisk temperatur 60°C**

**Barktykkelse**

**Barmasse**

**Gammel furu > ung furu > bjørk > gran**







**Foto : Paul Mjåland**



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# Naturlig foryngelse etter brannen

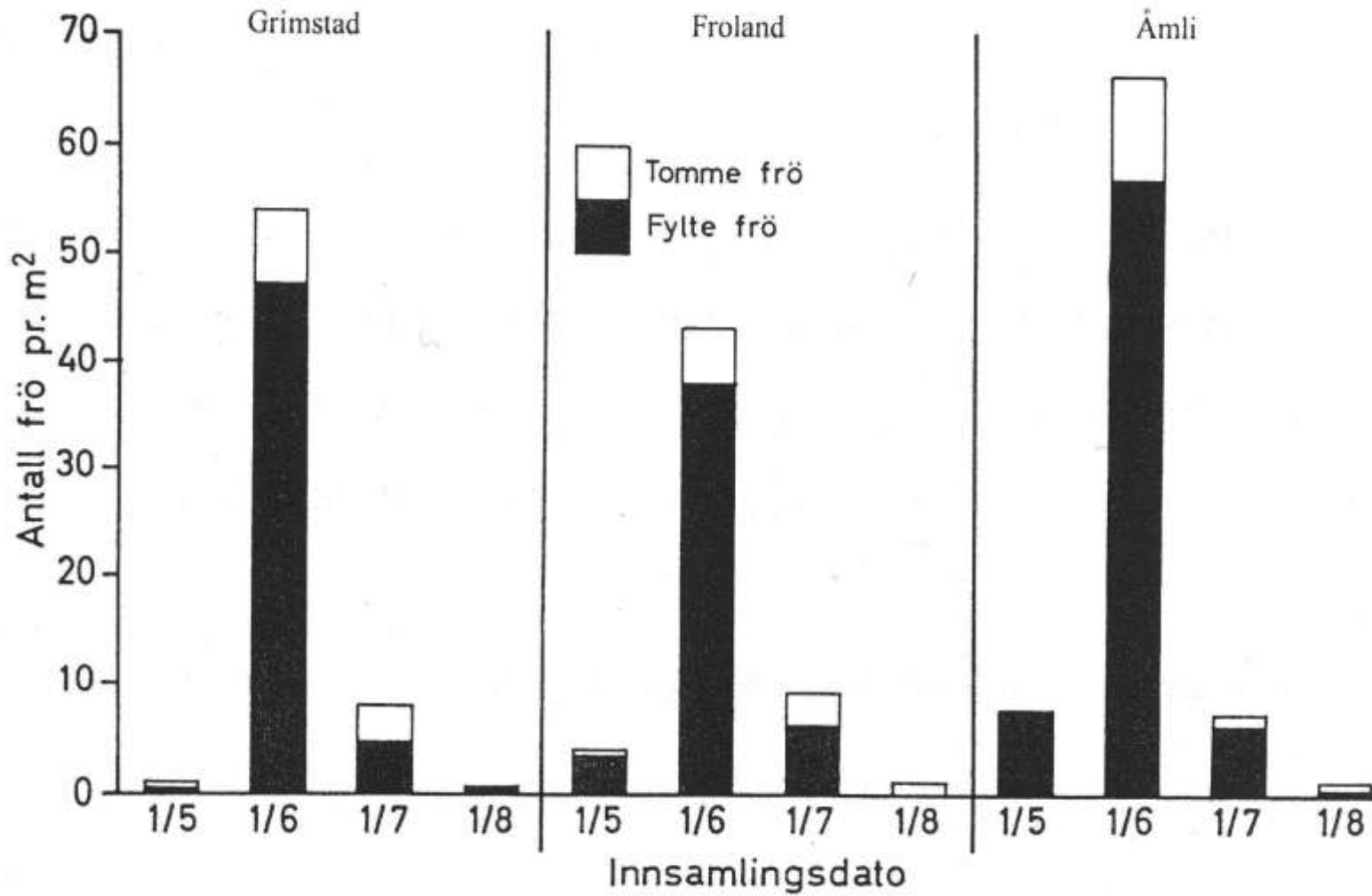




A young green plant with long, thin leaves is growing from a dark, charred log in a forest floor covered with mulch. The plant is the central focus, with its roots visible in the charred wood. The surrounding ground is covered in a layer of brown mulch, including twigs and leaves. The text is overlaid on the right side of the image.

**Blomstring  
Frøsetting  
Frømodning  
Frøspredning  
Spiring  
Etablering  
Abiotiske og  
biotiske filter**

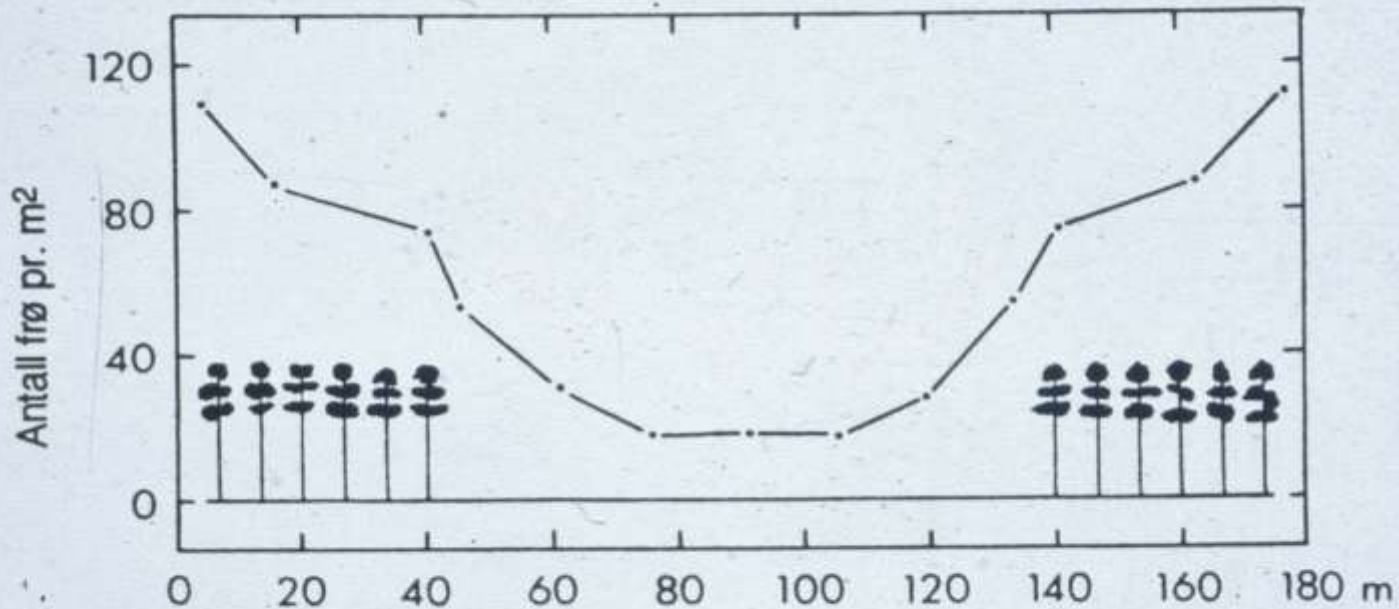
## Fröfall furu, 1970



## Skoklefald, 1970



# Hvor langt sprer frøene seg?



*Fordeling av frø i furubestand og på snauflete (etter Hesselman).*

# Våler

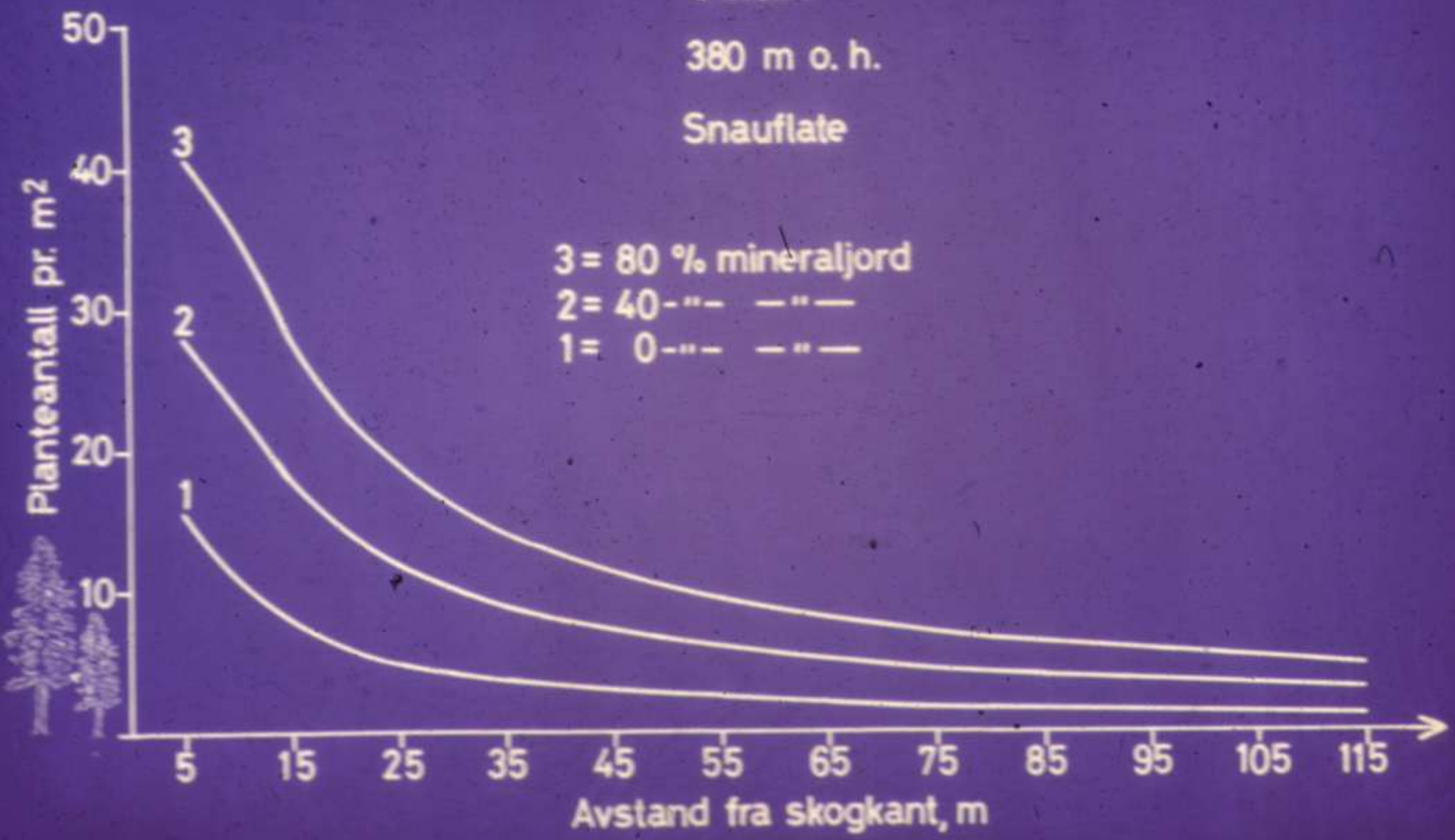
380 m o. h.

Snauflate

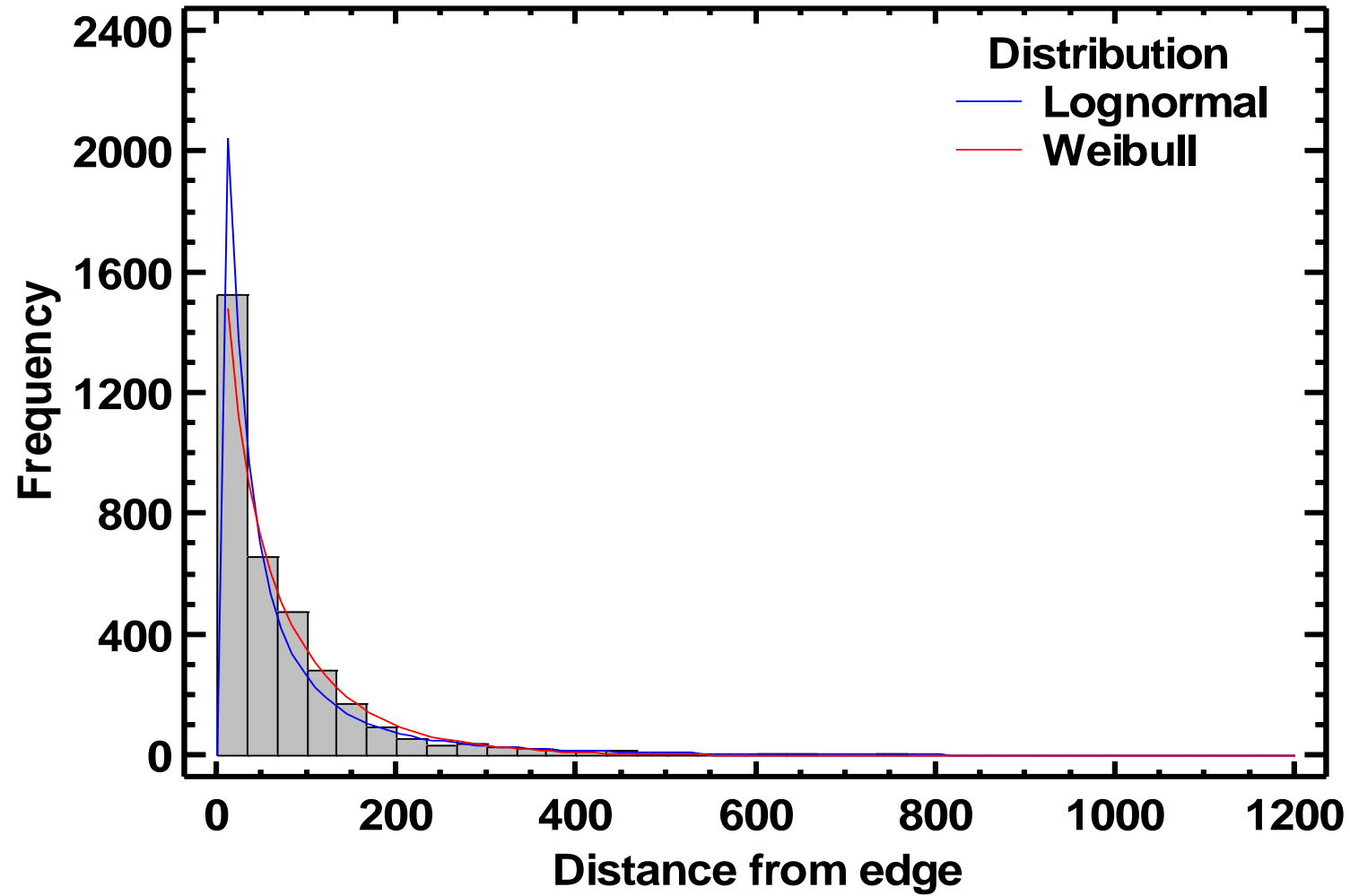
3 = 80 % mineraljord

2 = 40 % " " " "

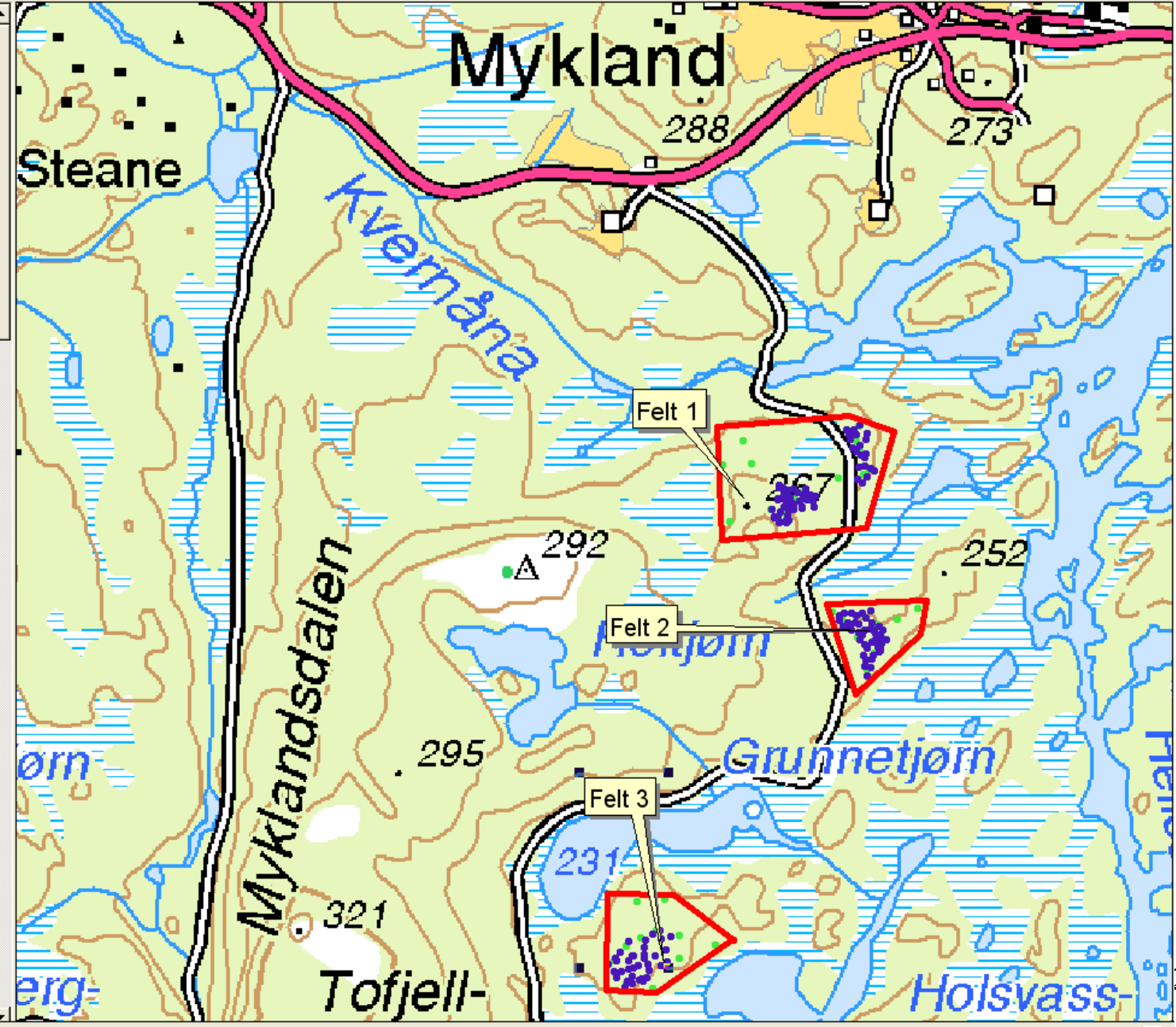
1 = 0 % " " " "



# Sitka spruce saplings



- Per1\_dump.jpg
- Forsøksfelt.shp
  -
- Profeller.shp
  -
- Frotrestillingfelt1.shp
  -
- Frotrestilling.shp
  -
- Frotleiid.shp
  -
- Bestbrann1.shp
  - 1
  - 2
  - 3
  - 4
  - 5
- Haraldbohem.shp
  -
- Utvalgte\_misområder\_froland321.shp
  -
- Utvalgte\_misområder\_froland32f.shp
  -
- Utvalgte\_misområder\_froland.shp
  -
- Utvalgte\_hulltre\_froland32p.shp
  -
- Avgrensn\_sept2008.shp
  -
- Avgrensn\_jurdalskn\_sept2008.shp
  -
- Brannomr\_mykland\_u32.shp
  -
- Utvalgte\_misområder\_froland.shp
  -
- Utvalgte\_hulltre\_froland.shp
  -
- Raust-agderan.tif
  - 1
  - 2
  - 3
  - 4
  - 5
- Bestbrann2.shp
  - 1
  - 2
  - 3
  - 4
  - 5
- Verneområder.shp
  -
- Profeller.shp

















**Foto : Paul Mjåland**





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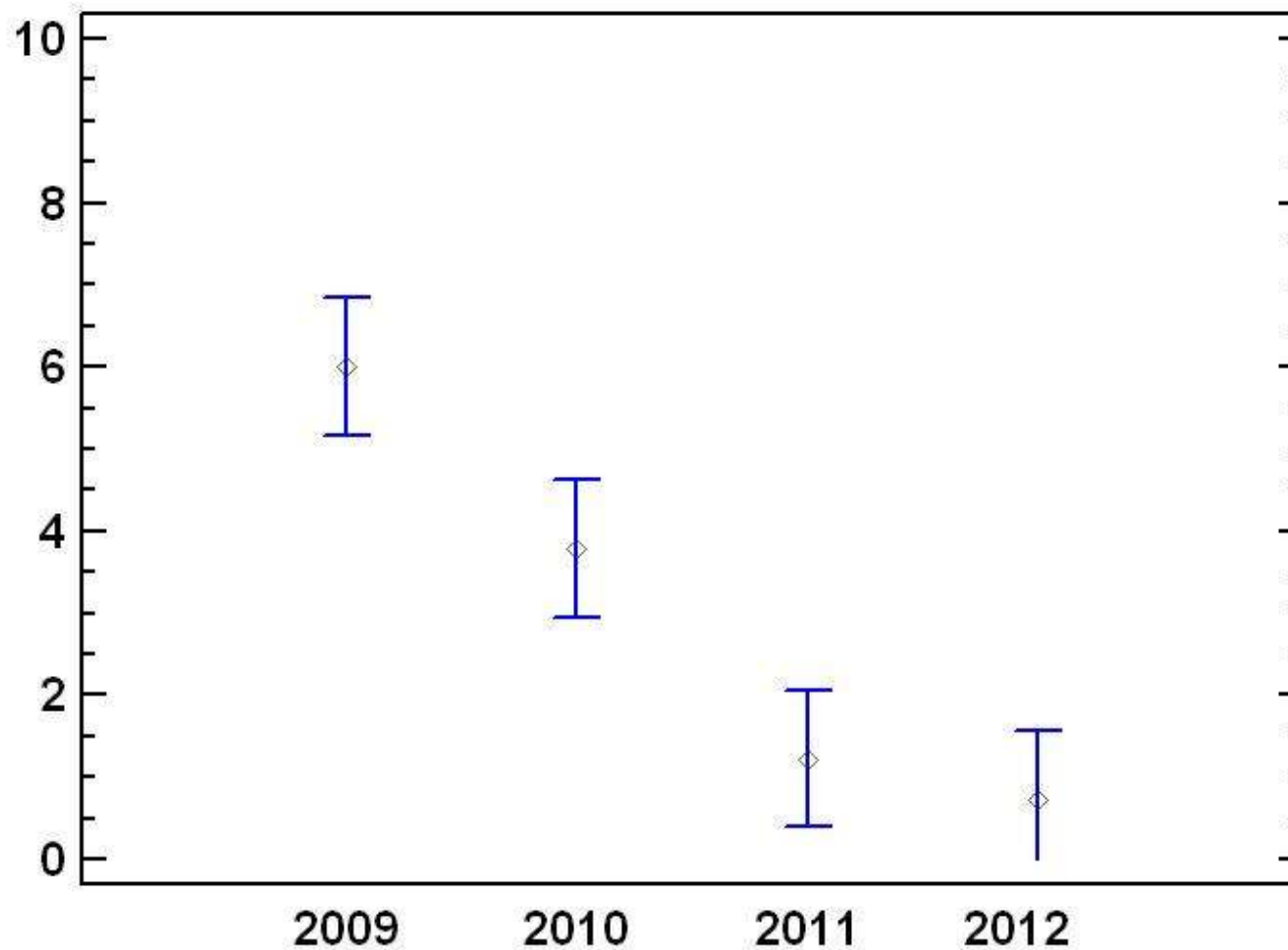




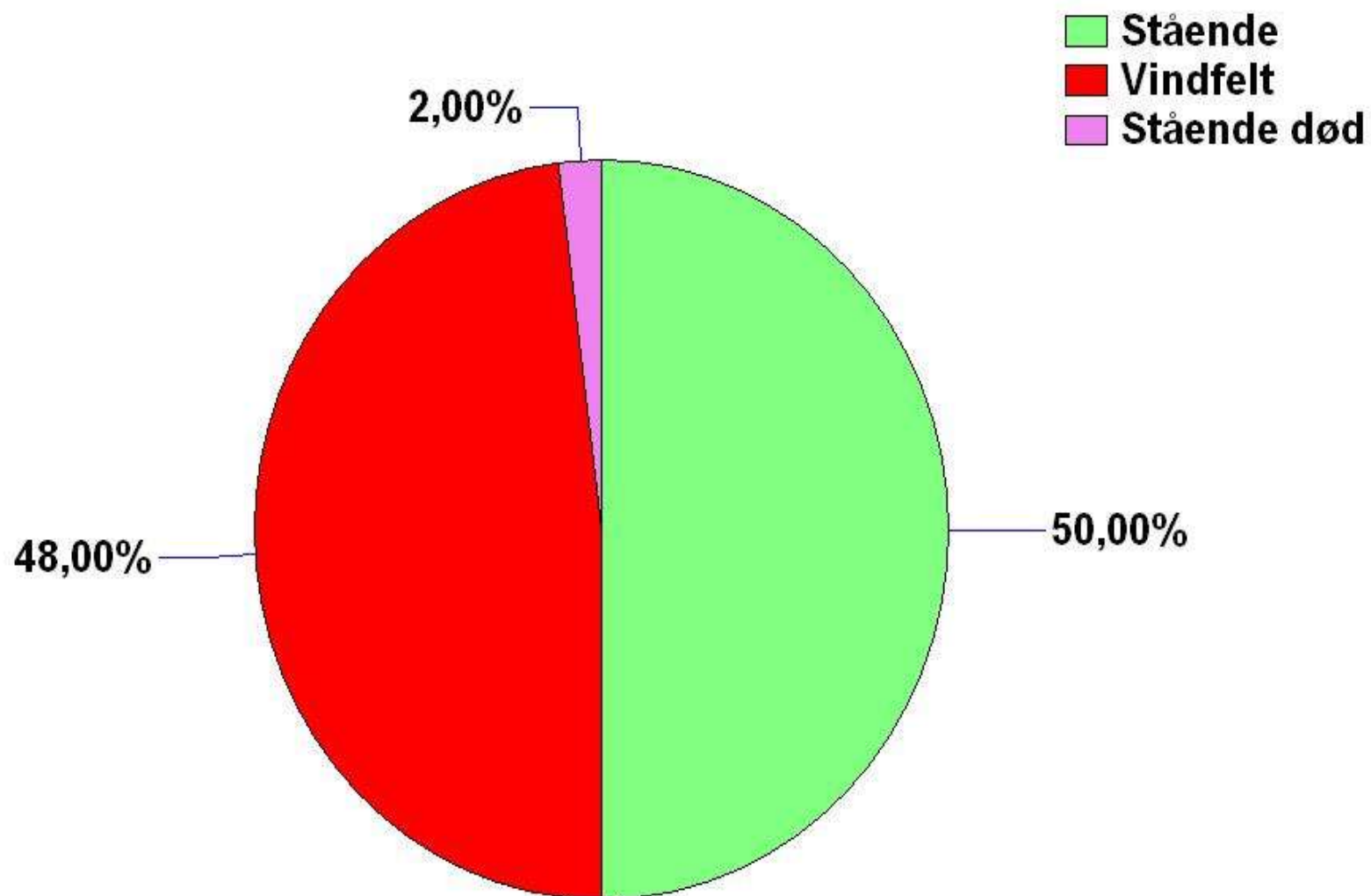




# Gjennomsnittlig antall frø per m2 for F1 F2 F3 (n=36)



## Stabilitet i frørestillingene på F1,F2 og F3 2012





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Forsøksfelt nr	Stående frøtrær %	Vindfelte enkeltrær %	Vindfelte dobbeltrær %	Vindfelte trippeltrær %
1	44	29	16	11
2	63	23	0	14
3	63	22	15	0





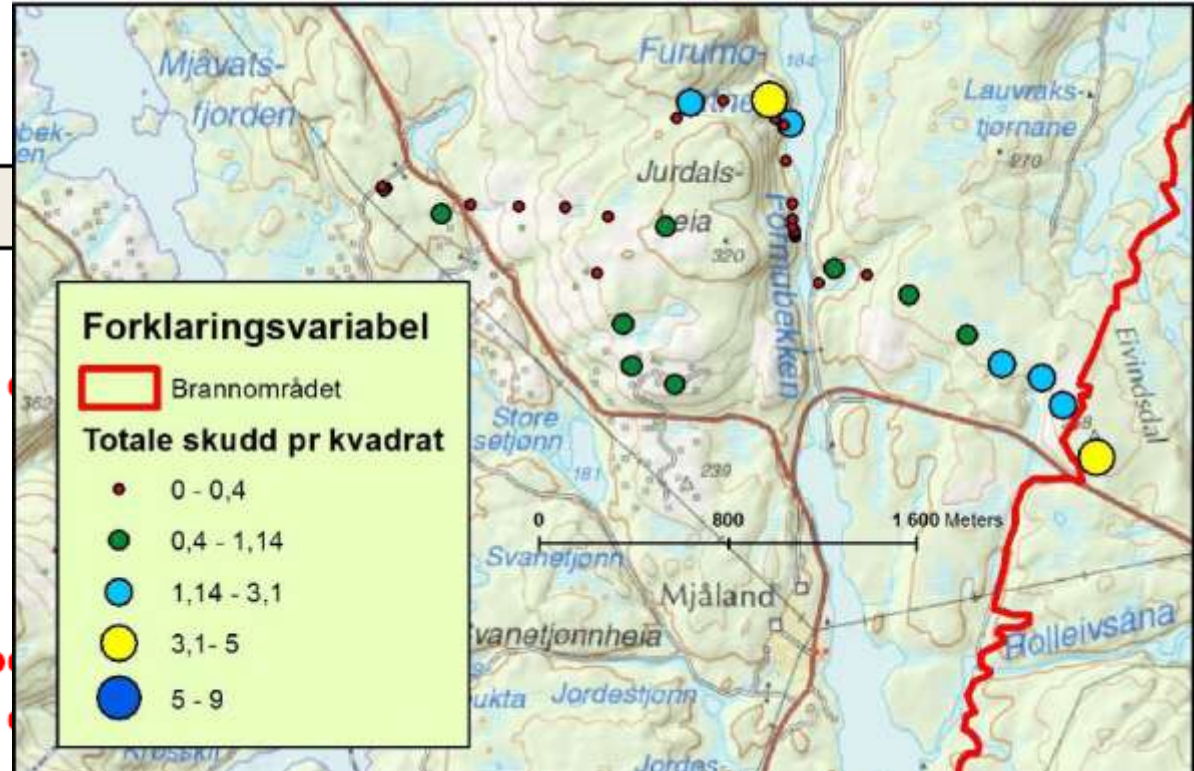
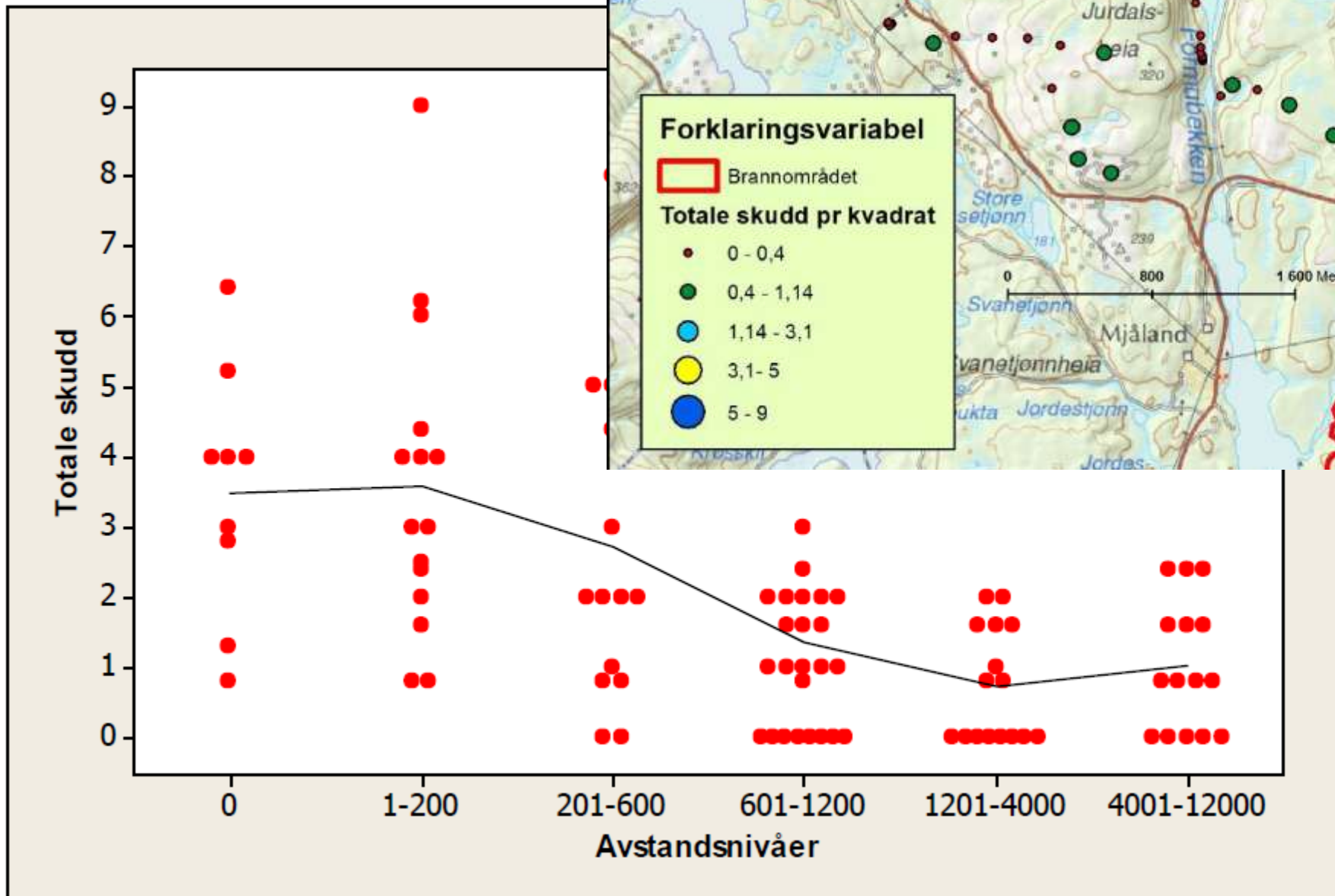
**2010**

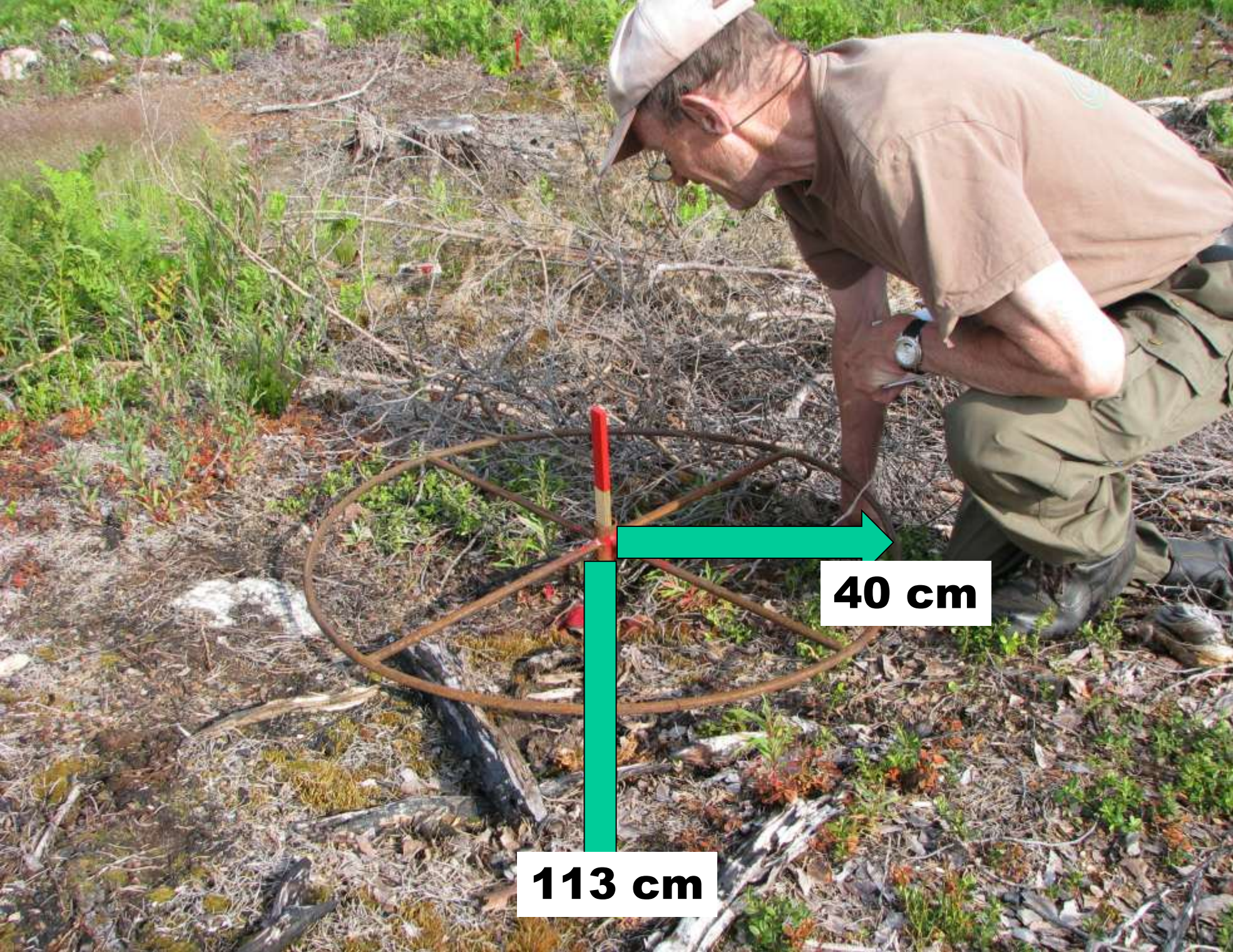




Figur 2. Bilde av stor margborer på furuskudd (foto: Rune Axelsson).







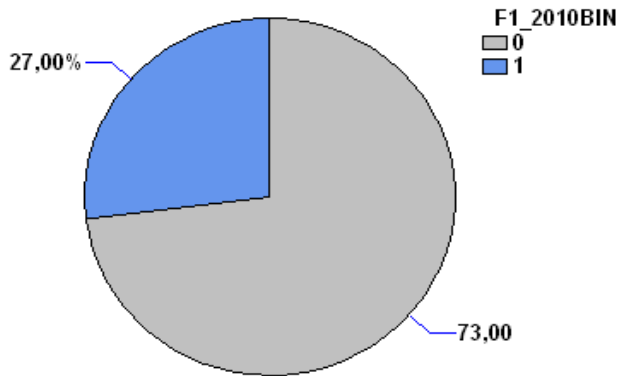
**40 cm**

**113 cm**



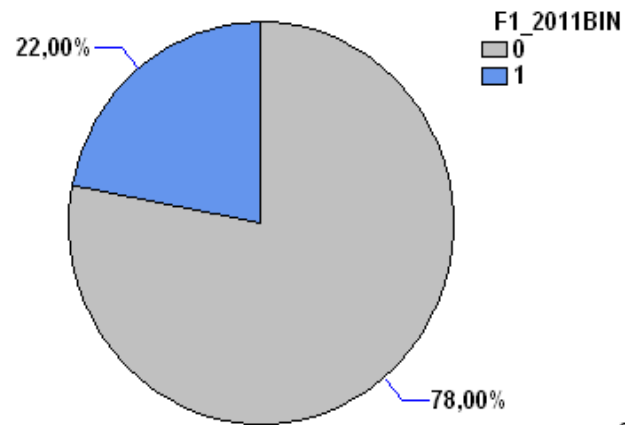
# F1 Skala: 0,5m2

Piechart for F1\_2010BIN



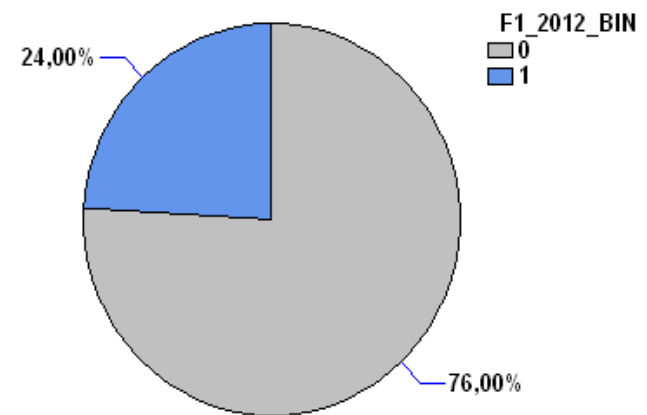
**2010**

Piechart for F1\_2011BIN



**2011**

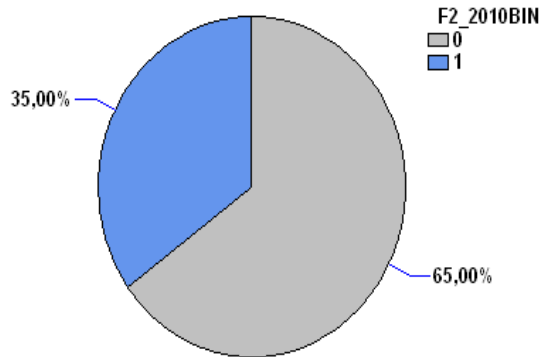
Piechart for F1\_2012\_BIN



**2012**



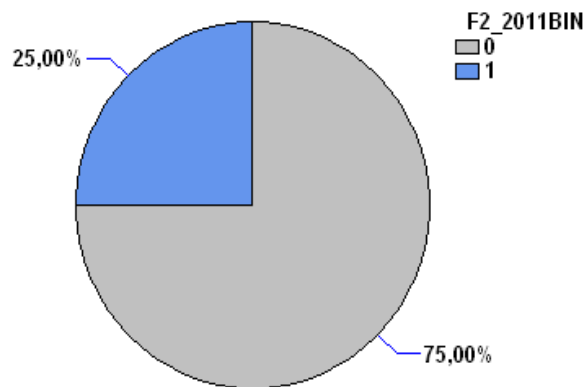
Piechart for F2\_2010BIN



# F2 Skala 0,5m2

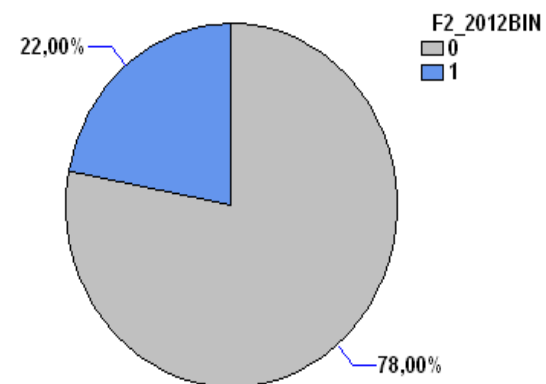
**2010**

Piechart for F2\_2011BIN



**2011**

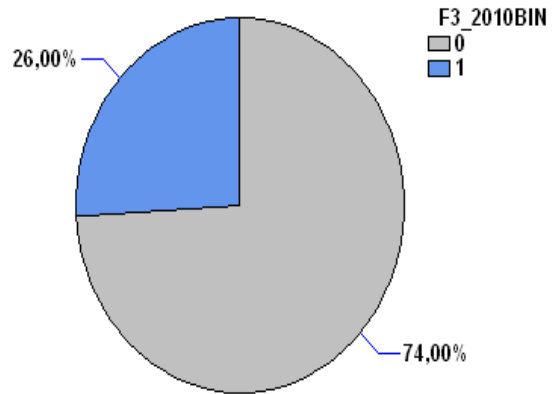
Piechart for F2\_2012BIN



**2012**

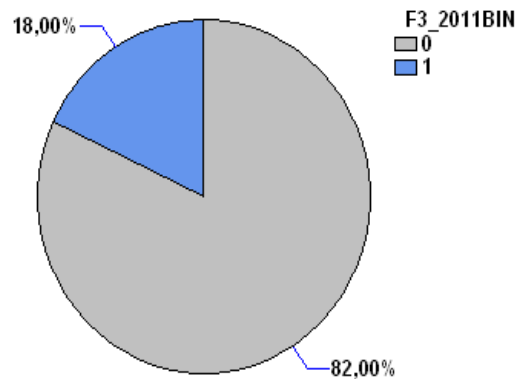
# F3 Skala 0,5m2

Piechart for F3\_2010BIN



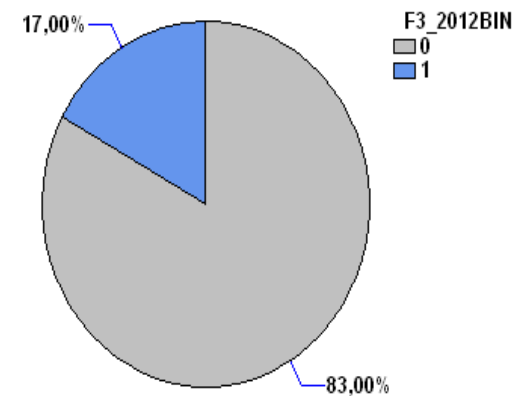
**2010**

Piechart for F3\_2011BIN



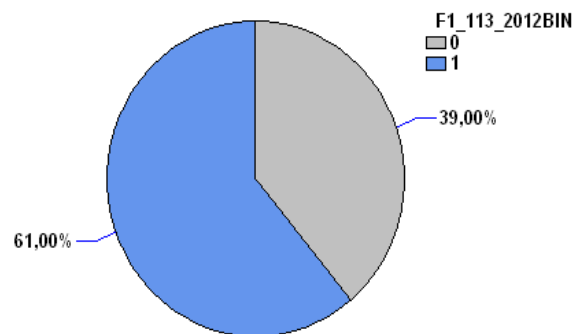
**2011**

Piechart for F3\_2012BIN



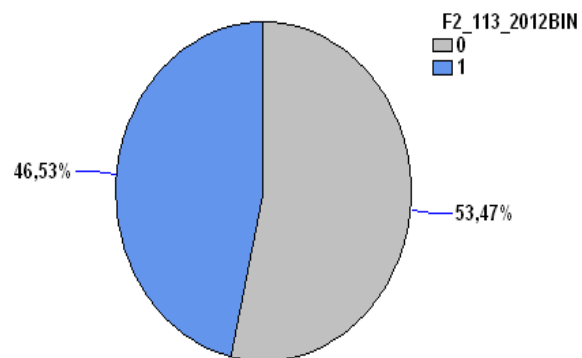
**2012**

Piechart for F1\_113\_2012BIN



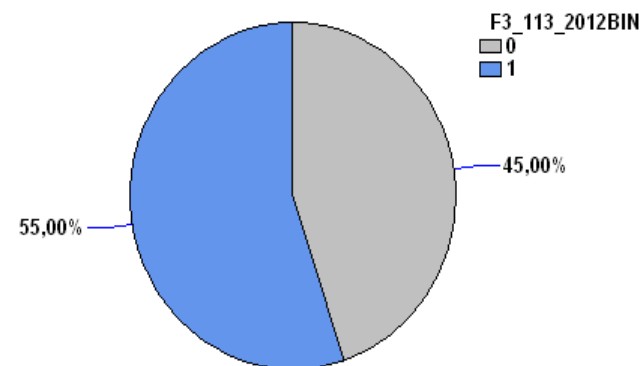
## F1 2012

Piechart for F2\_113\_2012BIN



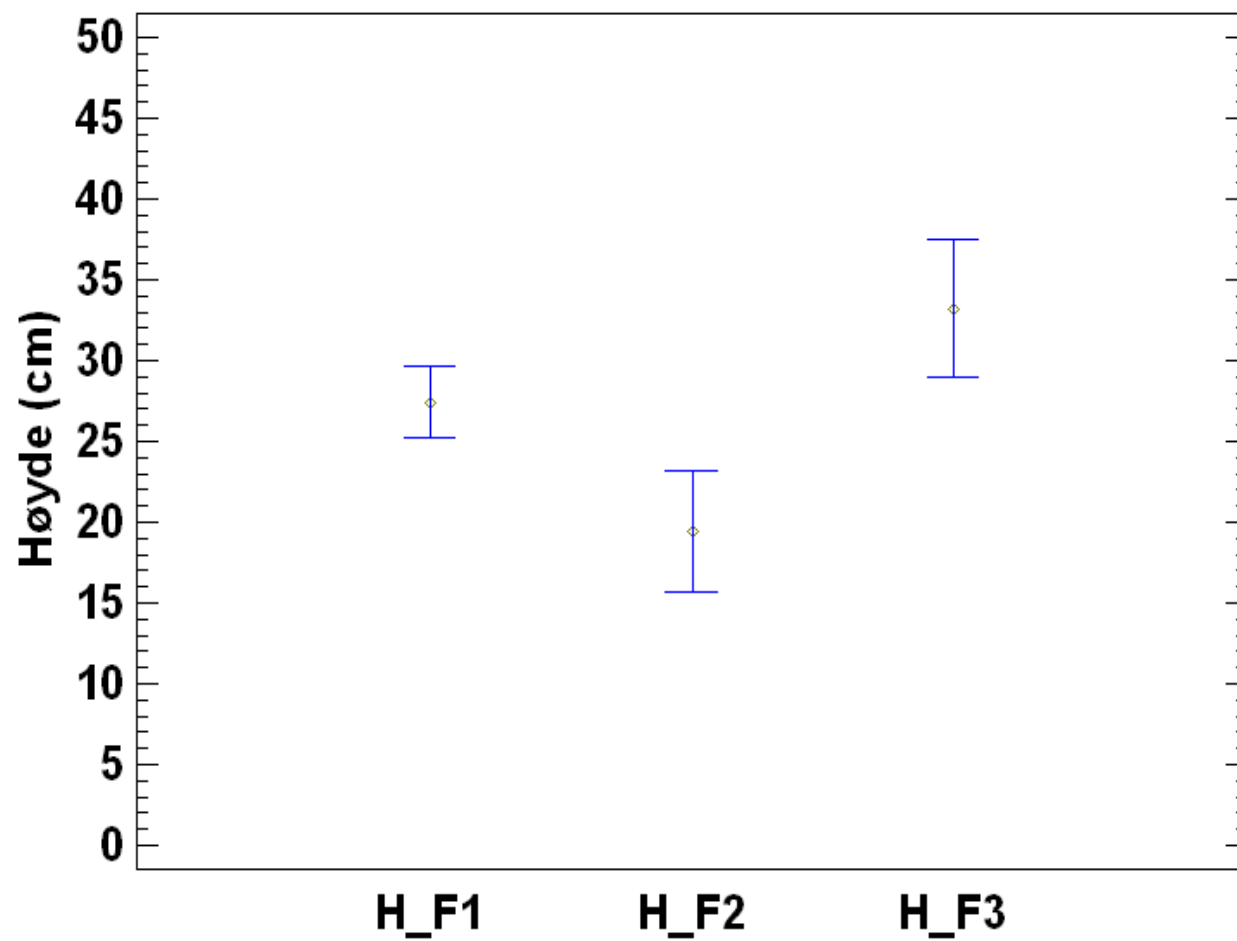
## F2 2012

Piechart for F3\_113\_2012BIN



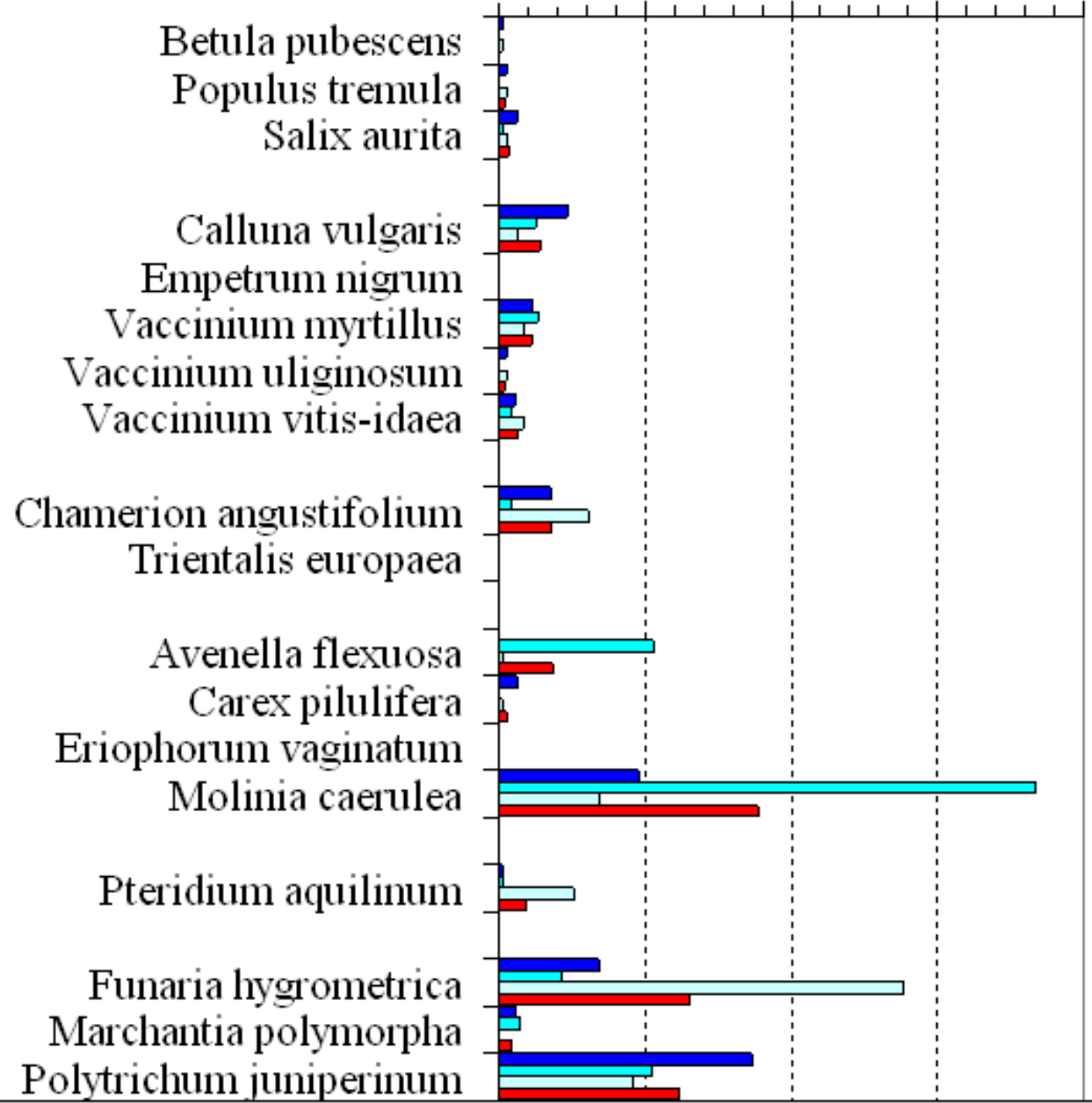
## F3 2012

## Høyde på furuforyngelse 2012 flate 1-3



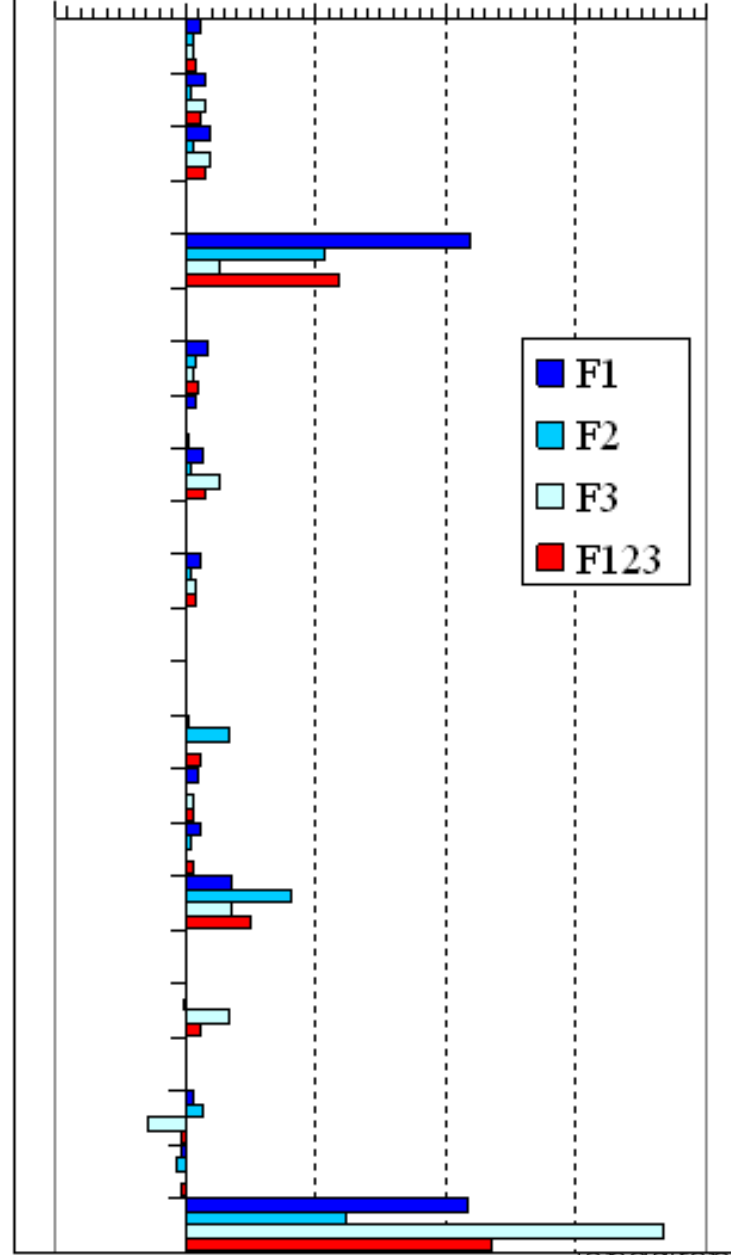
Mean cover 2010

0 5 10 15 20

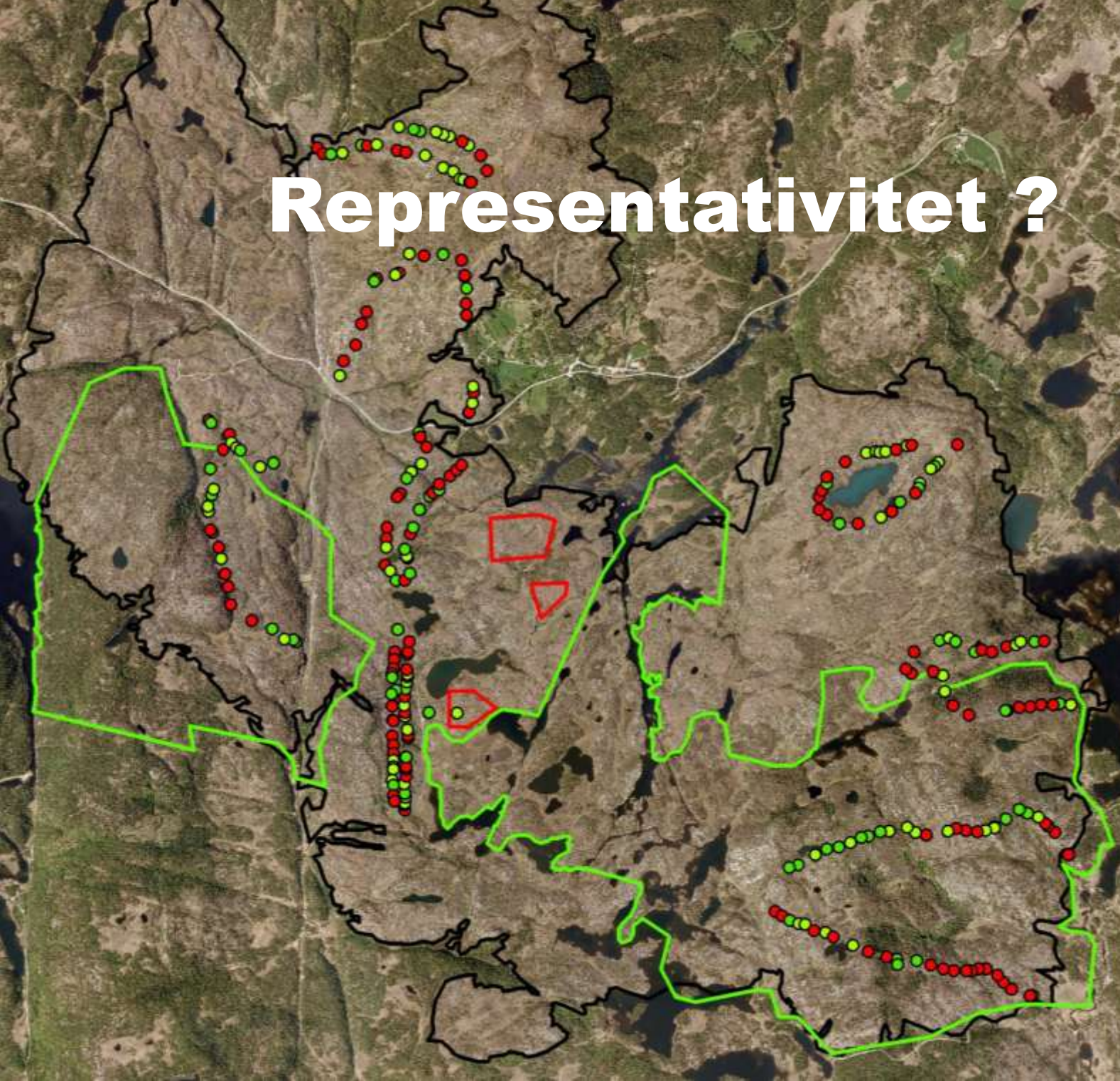


Mean cover change 2010 to 2012

-10 0 10 20 30 40

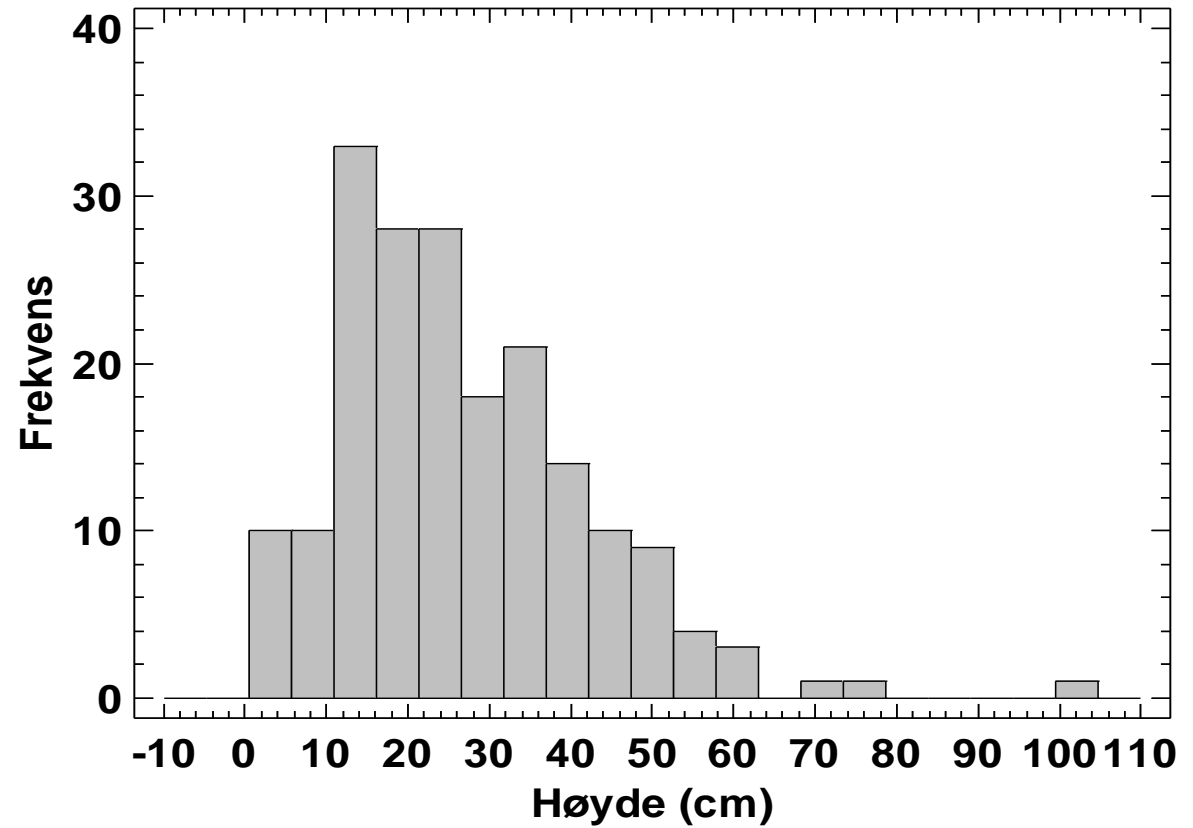


# Representativitet ?

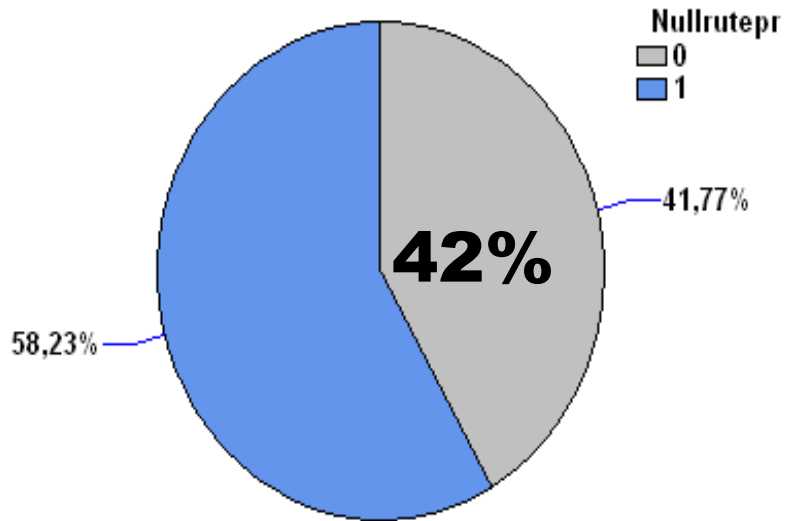


# Skala 4 m2

## Høydespredning furuforyngelse Mykland 2012



Piechart for Nullrutepr









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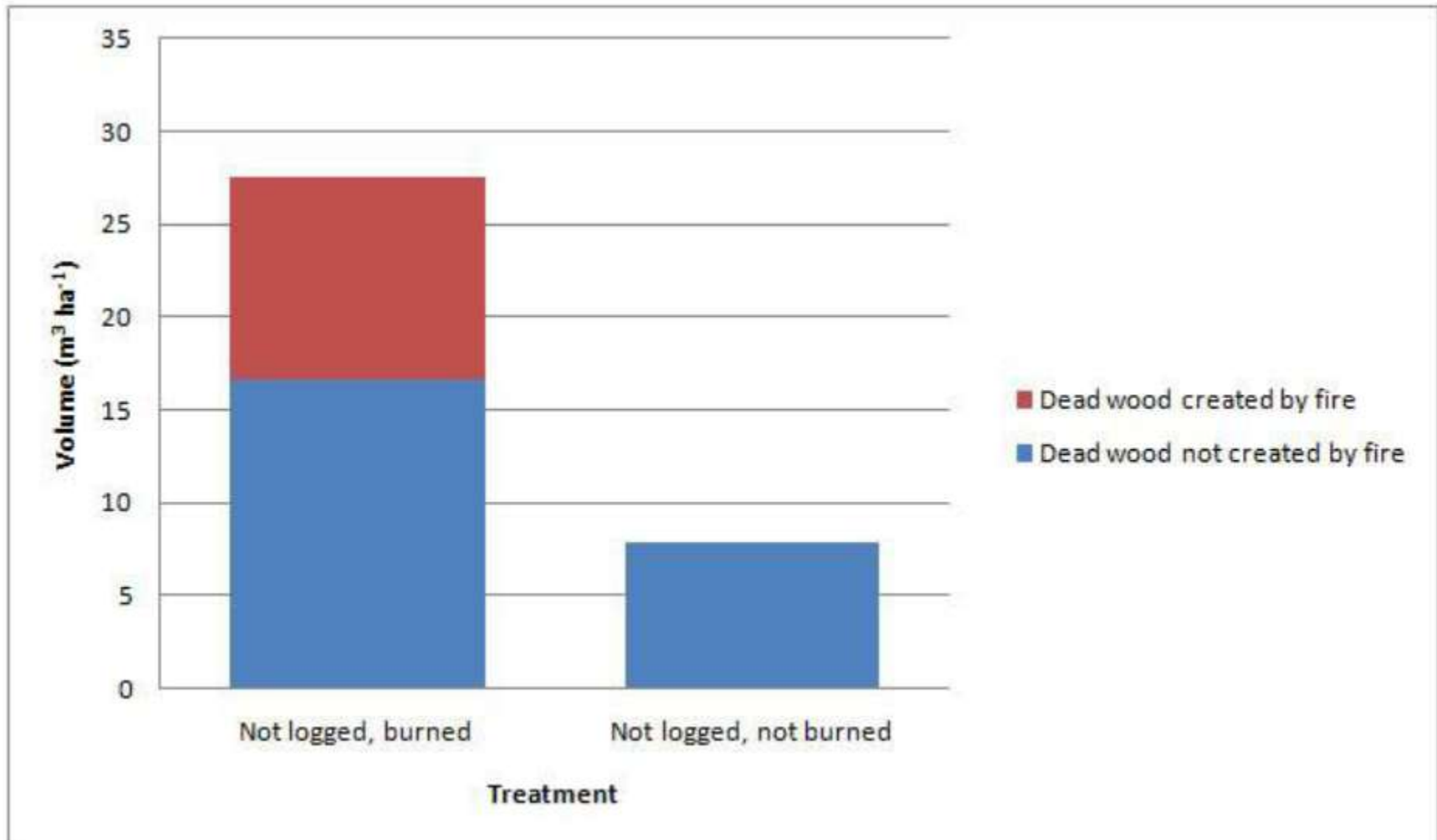
# Oppsummering på foryngelse

- **Foryngelsen er så langt god**
- **Avgang, margborer, snutebille**
- **Blåtopp, røsslyng og lauv?**
- **Foryngelse/elgbeite** 
- **Framtidig næringsbalanse?**



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**Pionerarter:**

**Bråtemose  
Einerbjørnemose  
Nikkemose**









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**G. bohemicum bråtestorkenebb**

**Skogstorkenebb**

**Tett klebrig håret**

**Spesiell lukt**

**Brannflater, hogstflater,**

**Frøspiring etter oppvarm. 60°C**

**Frøbank 100 år før spiring**

**Ektozoochori**









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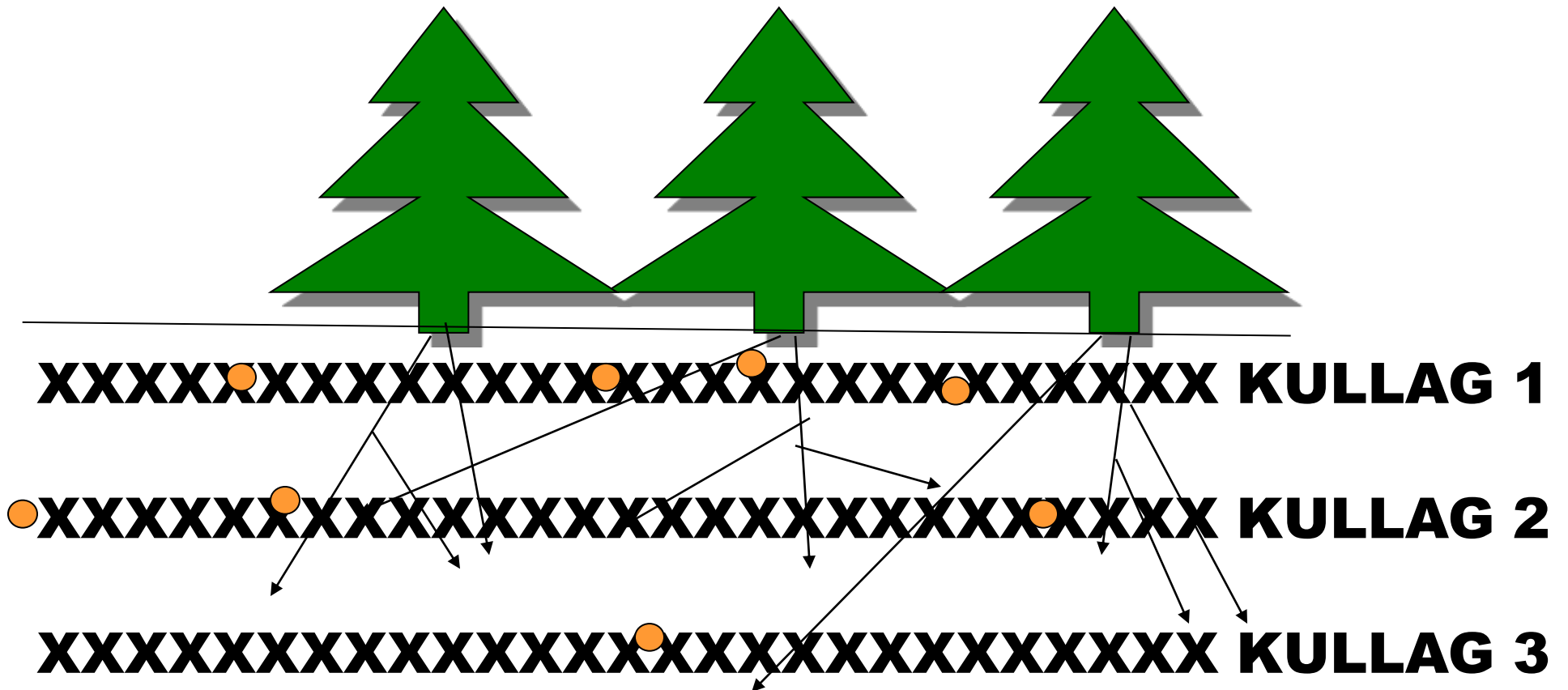






# Mineralisering/Nedbrytning ?





● Allelokjemisk komponent

**Skogbrann økologisk funksjon: Rensende effekt**  
**Reaktivering av kull ca 400 °C**



**Takk til gode sponsorer:  
Norges Skogeigerforbund  
Skogbrand  
Norges forskningsråd  
LMD/Skogoglandskap**

