

Status 2004 Dune heath

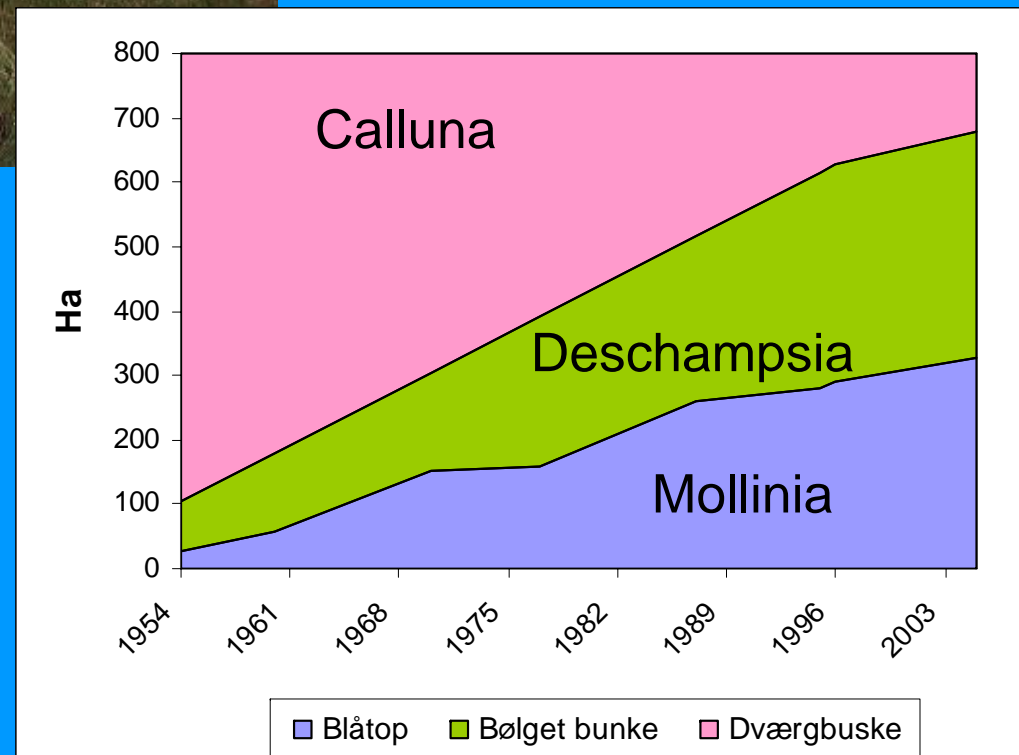
eutrofication of habitattypes



Heathland with *Chamaenerium angustifolium*

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**Development of cover of
scrubs and grasses on
Randbøll hede –
Hans Jørgen Degn (2006)**



STOP DECREASE IN BIODIVERSITY

QUALITY

AREA

Ecosystem function

Naturtype-structure

Eutrofication ↓ ↓ Acidification Hydrology Management Succession/climate/soil

Nutrient
pool size

Mineralisation

cover/bare soil

Veg.height

Charac. spec.

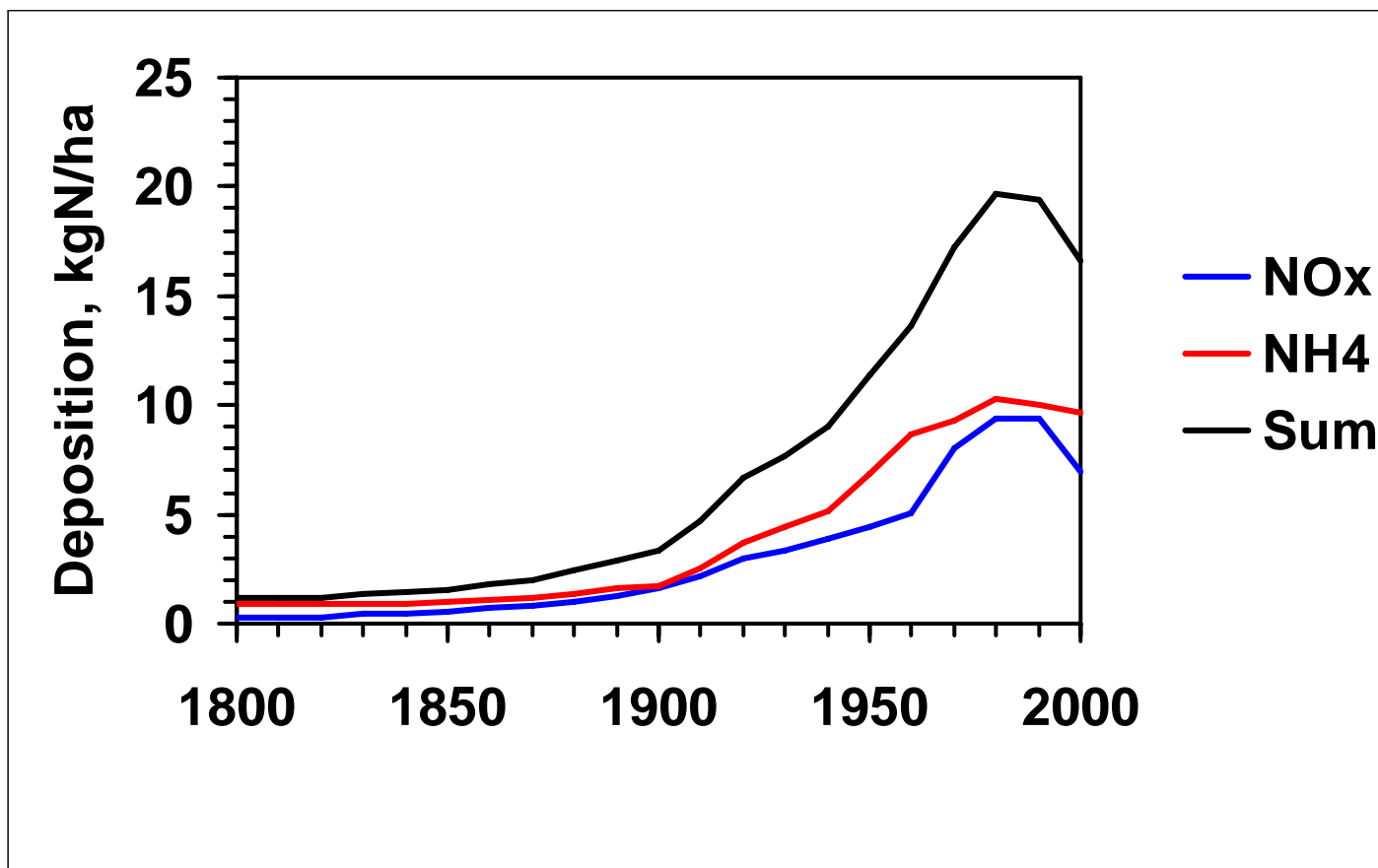


C/N in soil N i lichen/mos pH Nitrate in water pin-point

heath > 30	lichens < 6‰ N	crit. loads dune/heath/..... 10-20 kg N/ha y	Within the expected variation for the dune heath in Denmark. Stabile or improving	Stabile or improving
dune > 30	moss < 6‰ N			
raised bog > 30				
grasslands > 18				

.....

Historic atmospheric deposition of Nitrogen



Alweteg et al. 1998

Fanø Oct. 2002

Invasive species cover/ freq. of *Campylopus introflexus*

Stable or decreasing.

Should be less than 5% - at most 10% of total cover of cryptogams



WHAT IS A STATION?

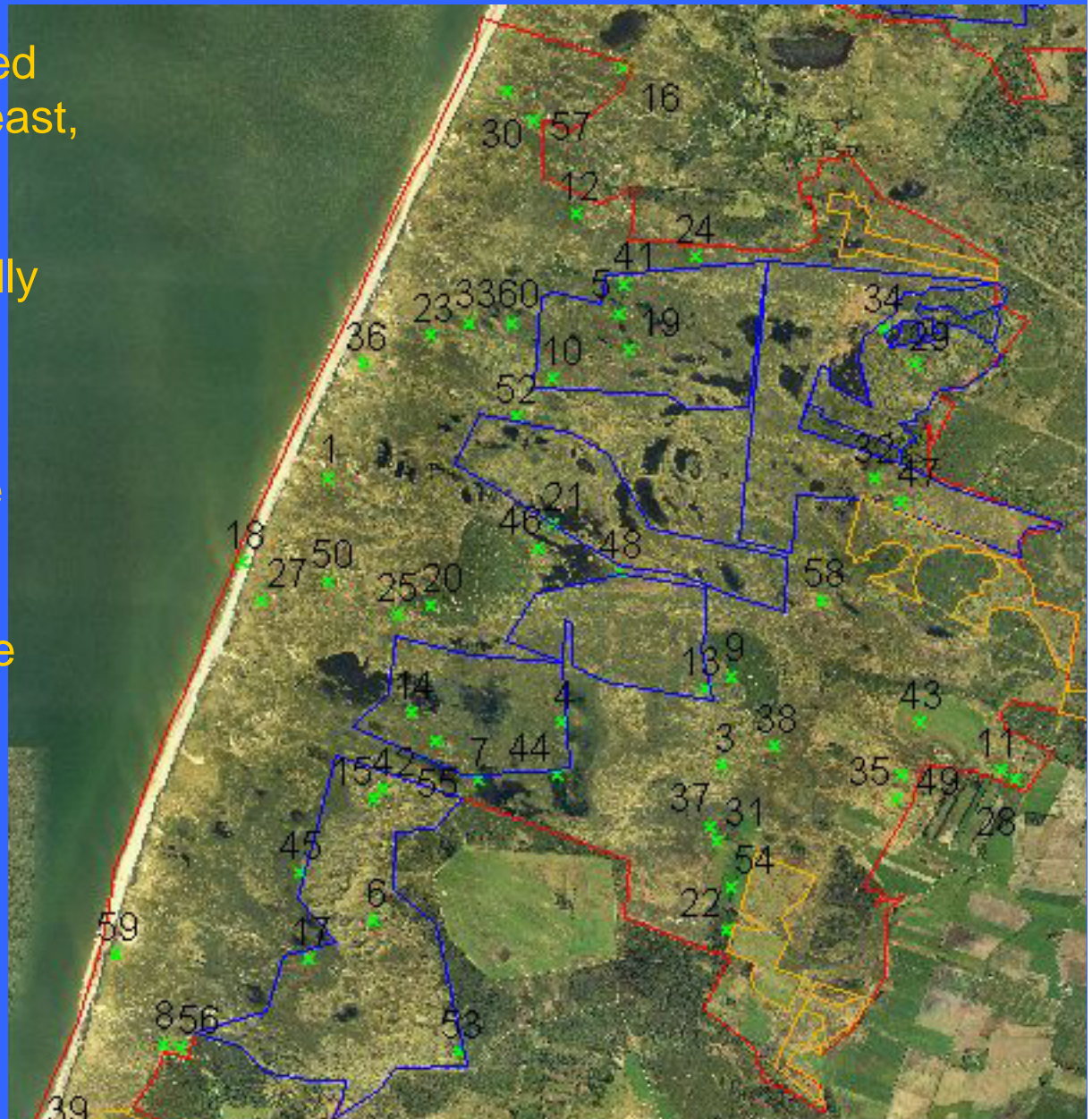
Stations are determined based on one habitat type (50% at least, i.e the type should dominate)

Stations cover the type broadly and includes often more nature type in mosaic.

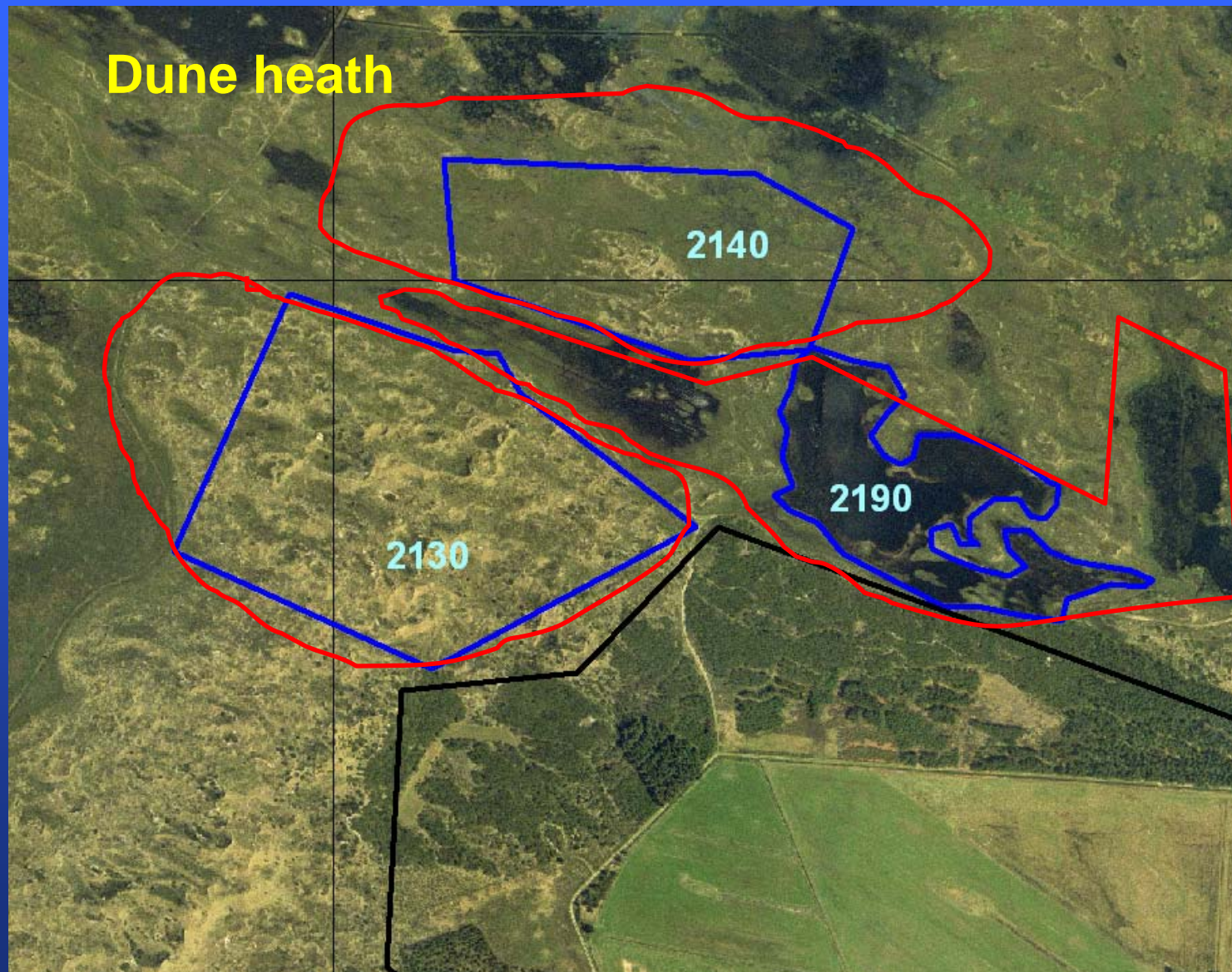
Natural units are preferred – including potential favourable and unfav. areas.

Based on randomised sample point of the following can be calculated:

- 1) Area of the individual habitat type
- 2) Changes in area between types



Habitat types should be defined broadly



POTENTIAL INDICATOR AS BACKGROUND FOR THE SCIENTIFIC CRITERIA

*

Quick responding parameters

- change in biomass, phenological measurements like change in shoot length, flowering, litter production, height etc. ...
- change in shoot-chemistry, aminoacids, stress tolerance...
- change in microbial biomass, respiration, mineralisation, decomposition, pH, conductivity
- soil water chemistry

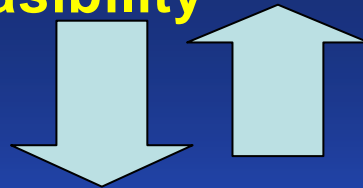
Slowly responding parameters

- changes in composition of species, invasive species, invasive species,
- C/N ratio, base saturation,

Functions parameters– processes and compounds connected to nutrient cycling

Parameters of prognosis

Vegetation dynamics:
Productivity, changes in biomass, competition, symbiosis (mycorrhiza), succession/mosaics, invasibility



Nutrient cycling
Processes (nitrification, mineralisation, immobilisation, acidification) base saturation, CEC, critical loads
Ratio (C/N, N/P, N/(K,Ca,Mg)),
nutrient leaching.....

Structure parameters - diagnosis

Descriptive parameters

Vegetation:

Cover of dominating species/ - trees/invasive species; distribution height/low species; lichen/moss ratio; bare soil/sand; calluna/empetrum ratio; erica/mollinia etc....

Hydrology:

Variation and gradients of water content; quick/baseflow.....

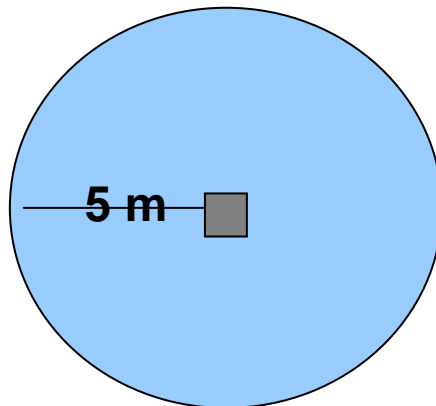
Soil:

pH, salinity, thickness of mor layers, mesofauna, bioturbation, distribution of particle size, amount/species of worms,.....

* Structure and function



Pinpoint- (0,5 x 0,5 m):
cover of species
supplementary species
pH in soil and water
conductivity
C/N - ratio
phosphorous
nitrate in water
N % in shoots, lichen, mosses
and biomass



Observations is 5 m circle:
Identification of habitatype
Frequency of species
height of vegetation
Cover of trees
pct. cover of water
pct. gaps in vegetation
pct. cover of invasive species

Structure of the vegetation - Lichen/moss;
empetrum/calluna; grasses/dwarf scrubs
heigh/low species etc.....

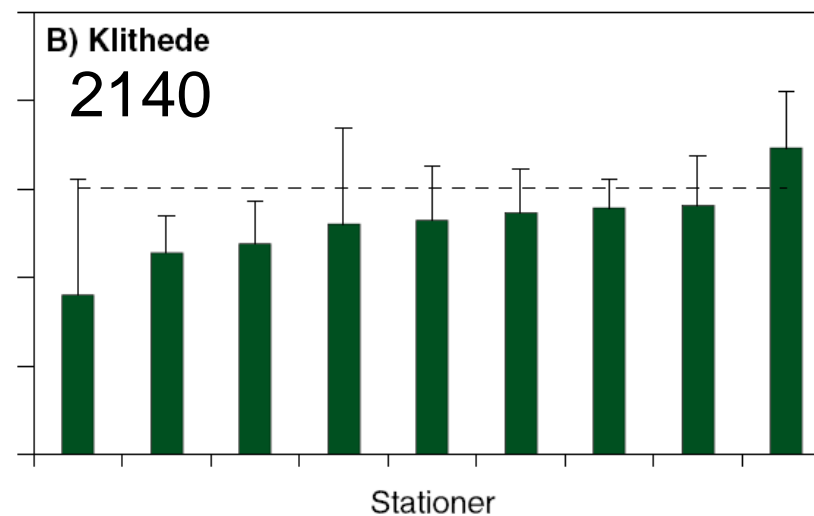
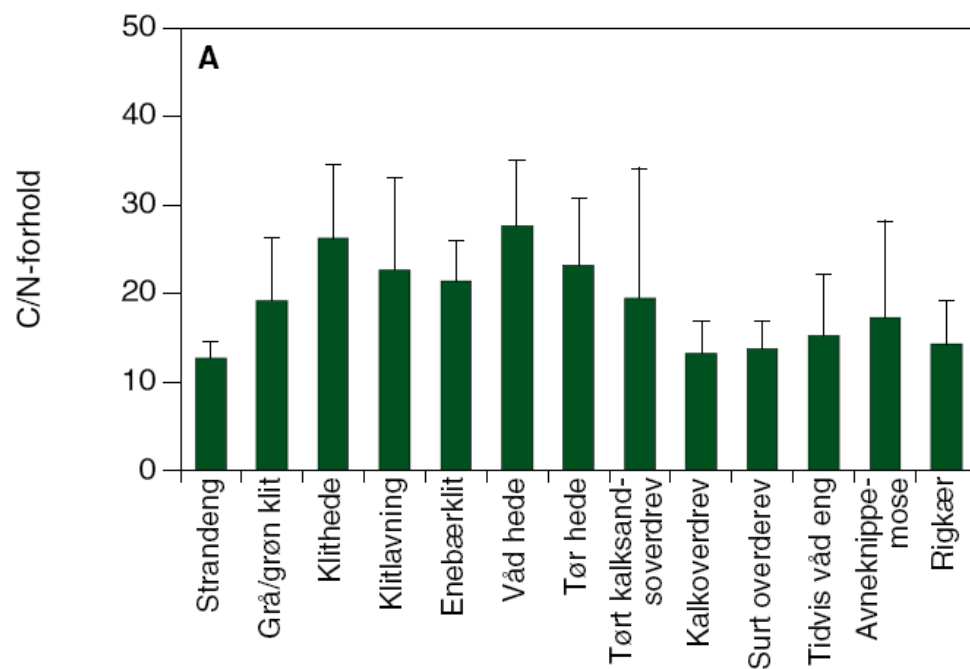


	Ratio	Lichens	Moss
Lodbjerg	20	25	0,80
Stenbjerg	15	25	0,60
Rømø	6	22	0,30
Fanø	8	32	0,25

CN

A) Overview habitat types

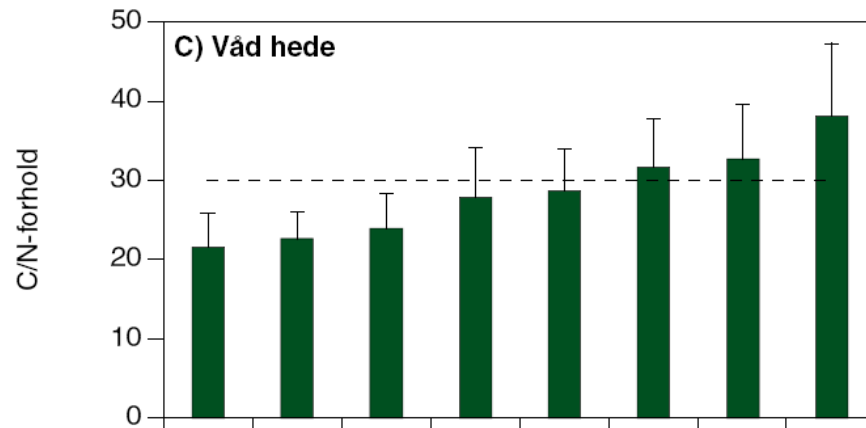
B) Dune heath



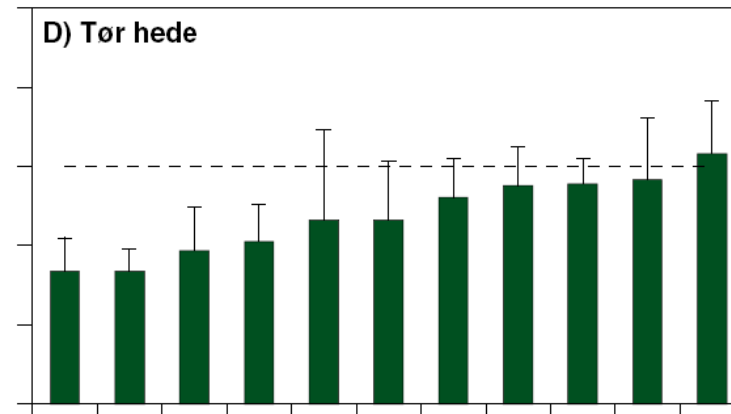
Average and dev. is shown.

C/N

C) Wet heath



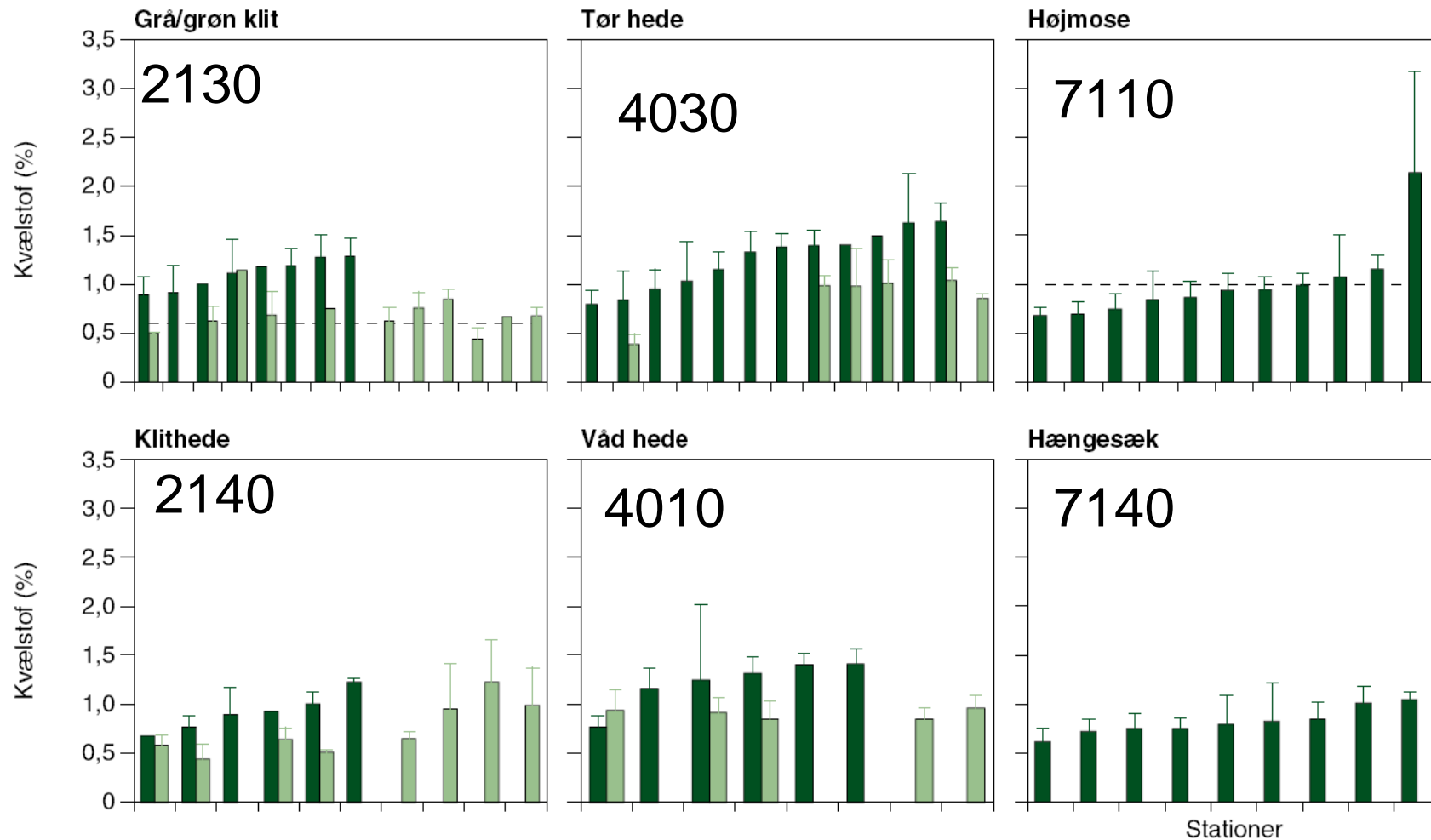
D) Dry heath



Average and dev. is shown.

Nitrogen content in lichen and mosses

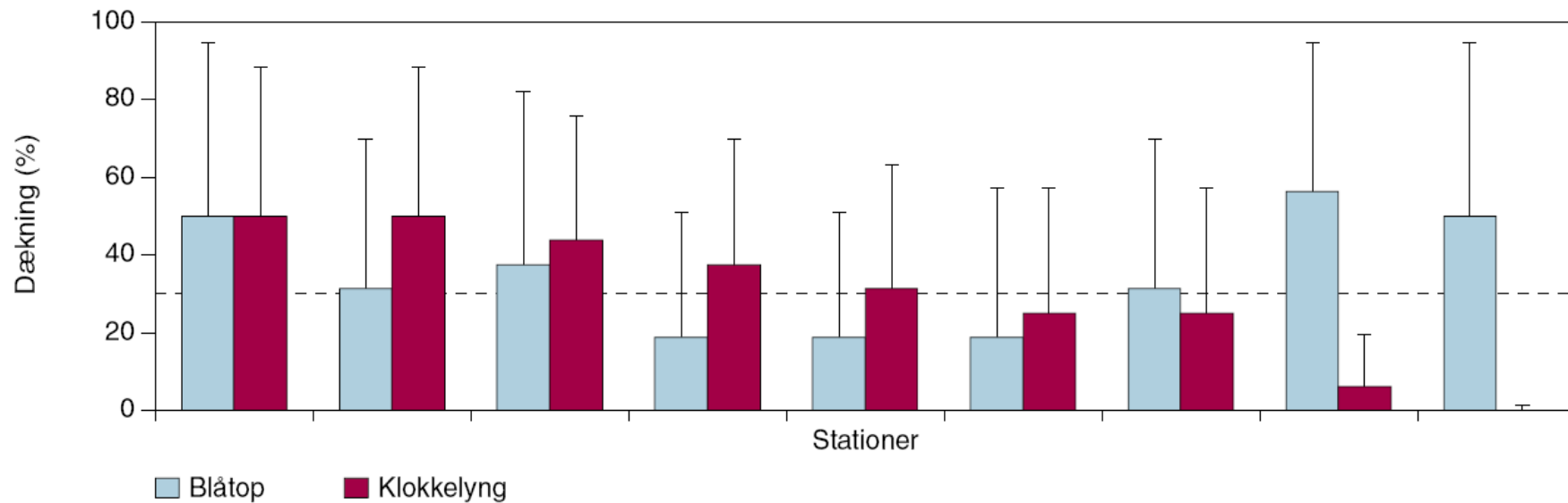
■ % N i mos ■ % N i lav



Cover in % for *Erica tetralix* and *Mollinia cae.* on "wet heath".

The station are sorted after decreasing cover of *Erica tetralix*

The line marks the criteria for cover of *Mollinia*



Figur 11

Cover in % for Calluna and Descampsia on dry heath

The station are sorted after decreasing cover of Calluna

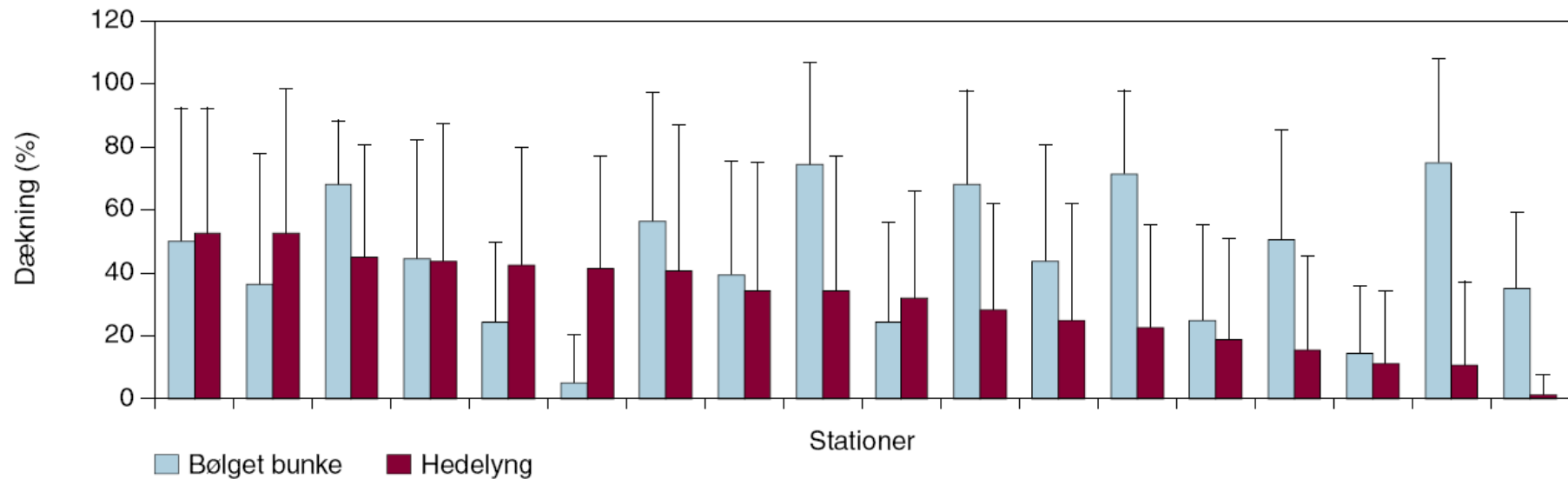
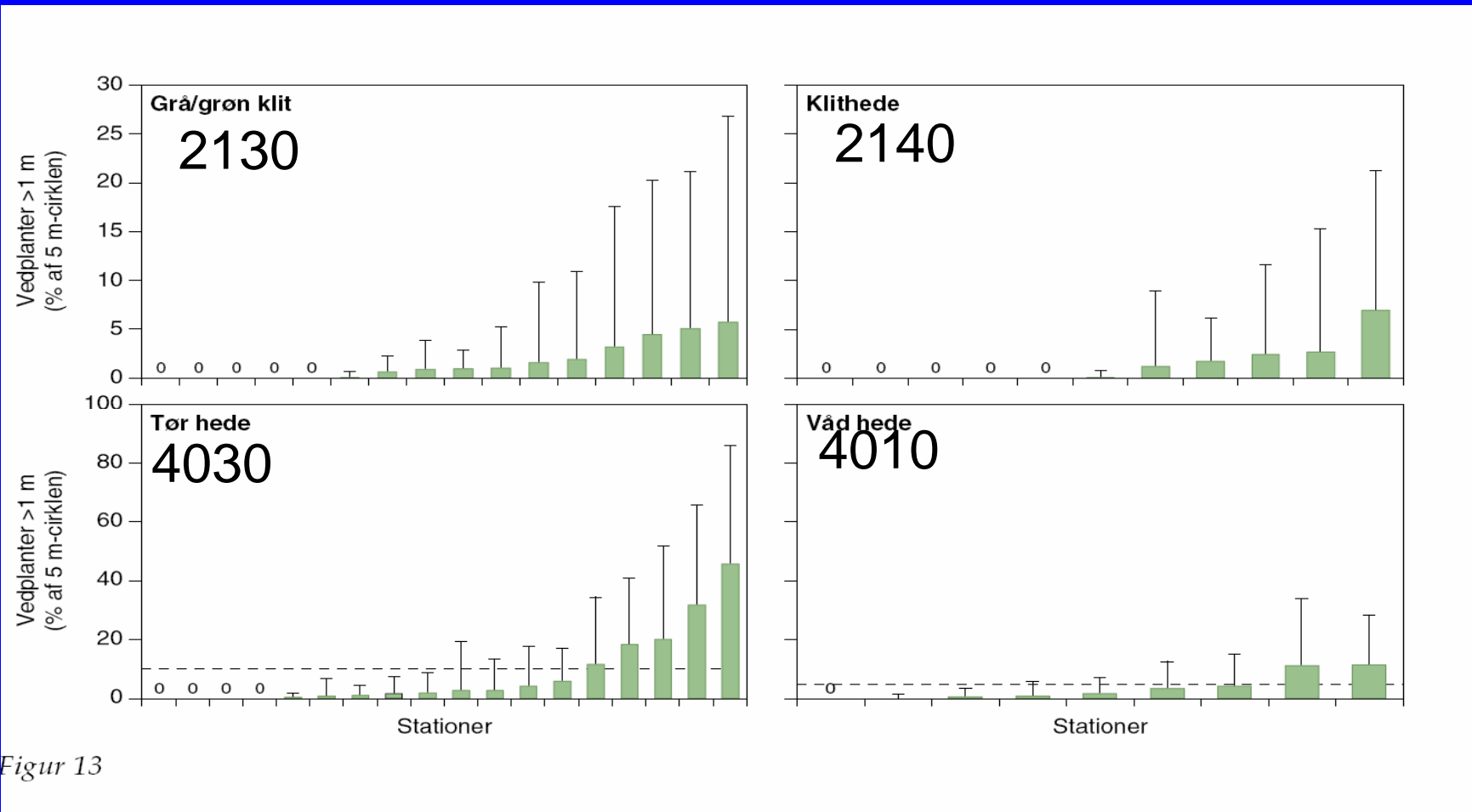


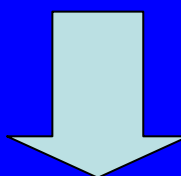
Figure 12

Cover of trees > 1 m for heath and dune habitat types. The lines marks the criteria for cover of trees on wet and dry heath



Figur 13

Conclusion: Status on dune heath

- C/N too low on 8 out of 9 stations
 - Nitrogen content in mosses high in all sample plots
 - Relatively low cover of invasive species (Campylupus, Rosa etc.....)
 - Low cover of trees
- 
- Deposition around critical loads
 - Possibility of species change?

Connection of biogeochemistry and vegetation data

- Do the indicators point in the same direction
- to support the relation between cause and effect
- to evaluate the use of the individual indicators on the long run – i.e. if the biogeochemical indicators are better as early warning of changing condition on habitats.
- should be used to predictive modelling