

UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

Registering mammalian herbivory in plant communities

Kari Anne Bråthen

ABA session: How to approach collaborative research on herbivory: an ecological interaction of key importance





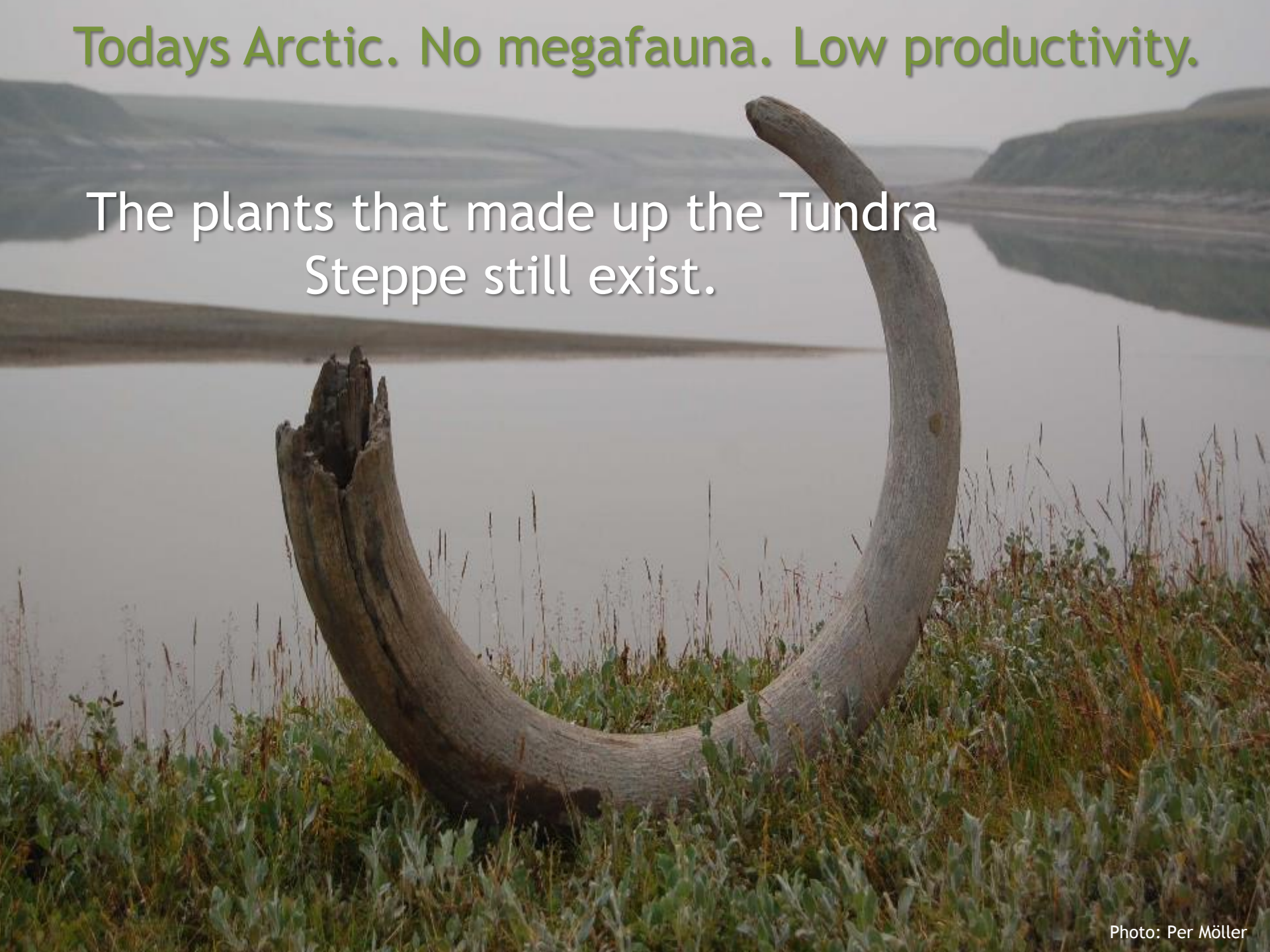


Mauricio Anton via PLoS Biology

Tundra Steppe under the Last Glacial Maximum

Today's Arctic. No megafauna. Low productivity.

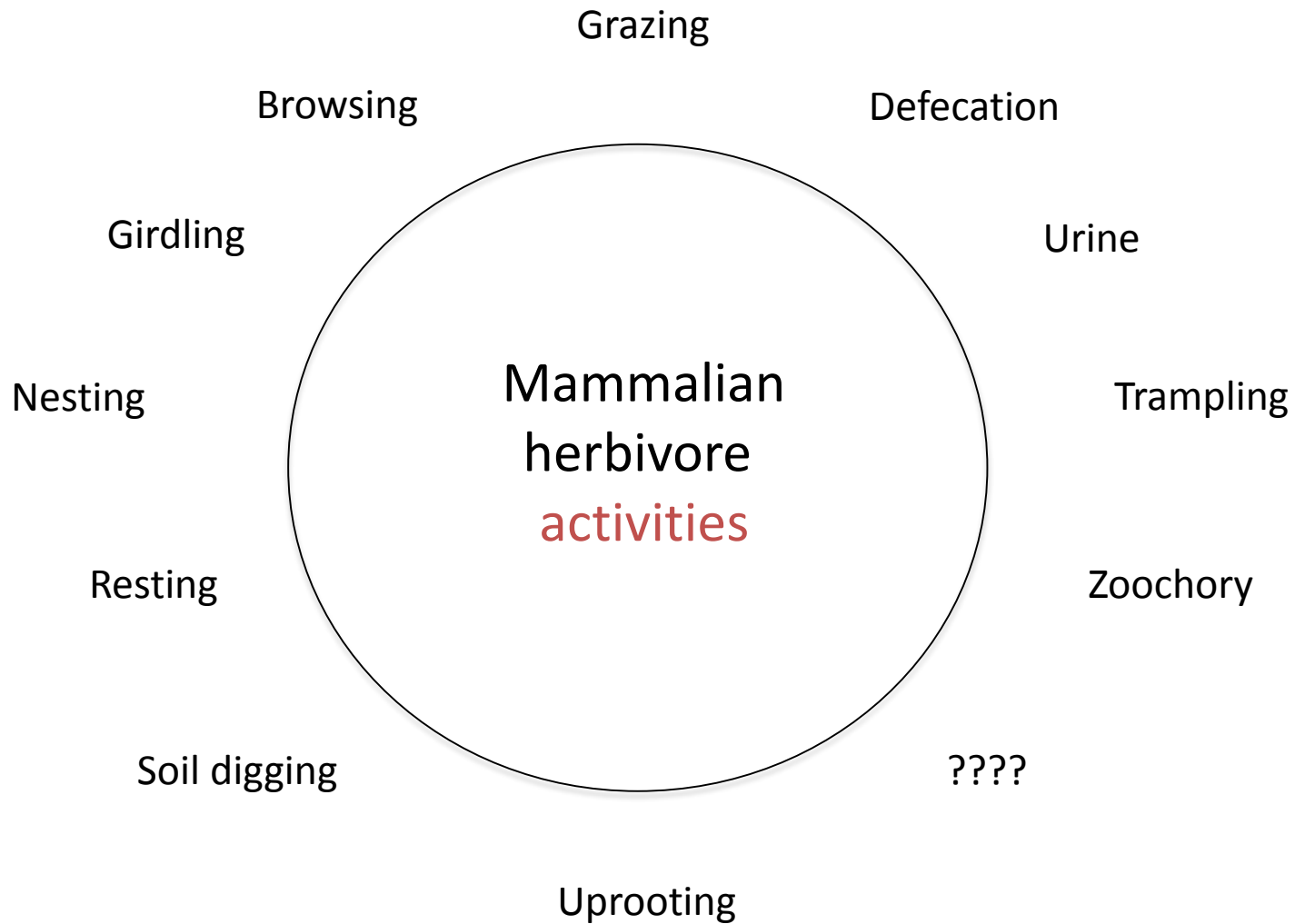
The plants that made up the Tundra
Steppe still exist.



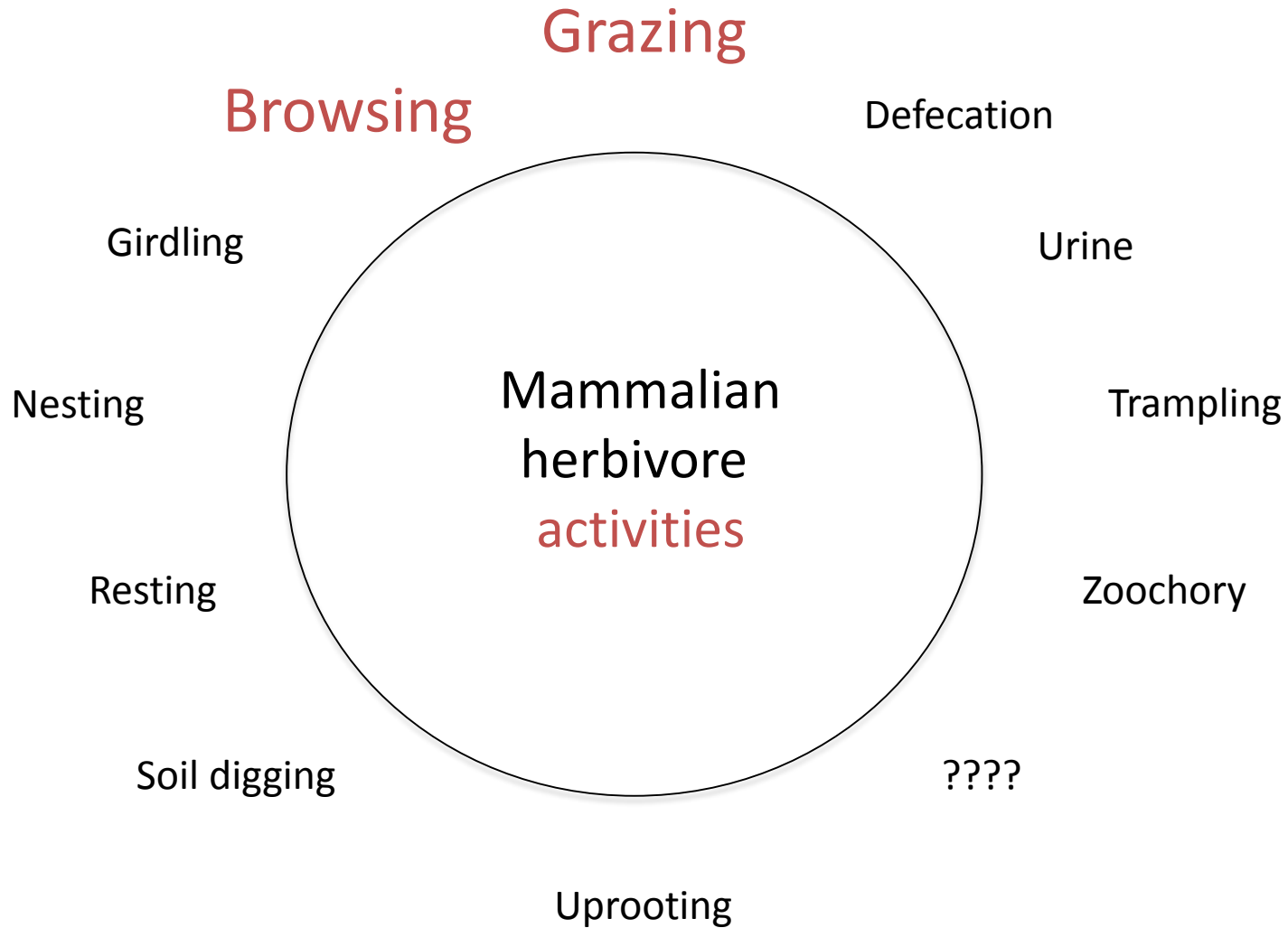


mammalian
herbivores

Herbivory – the eating of plants...



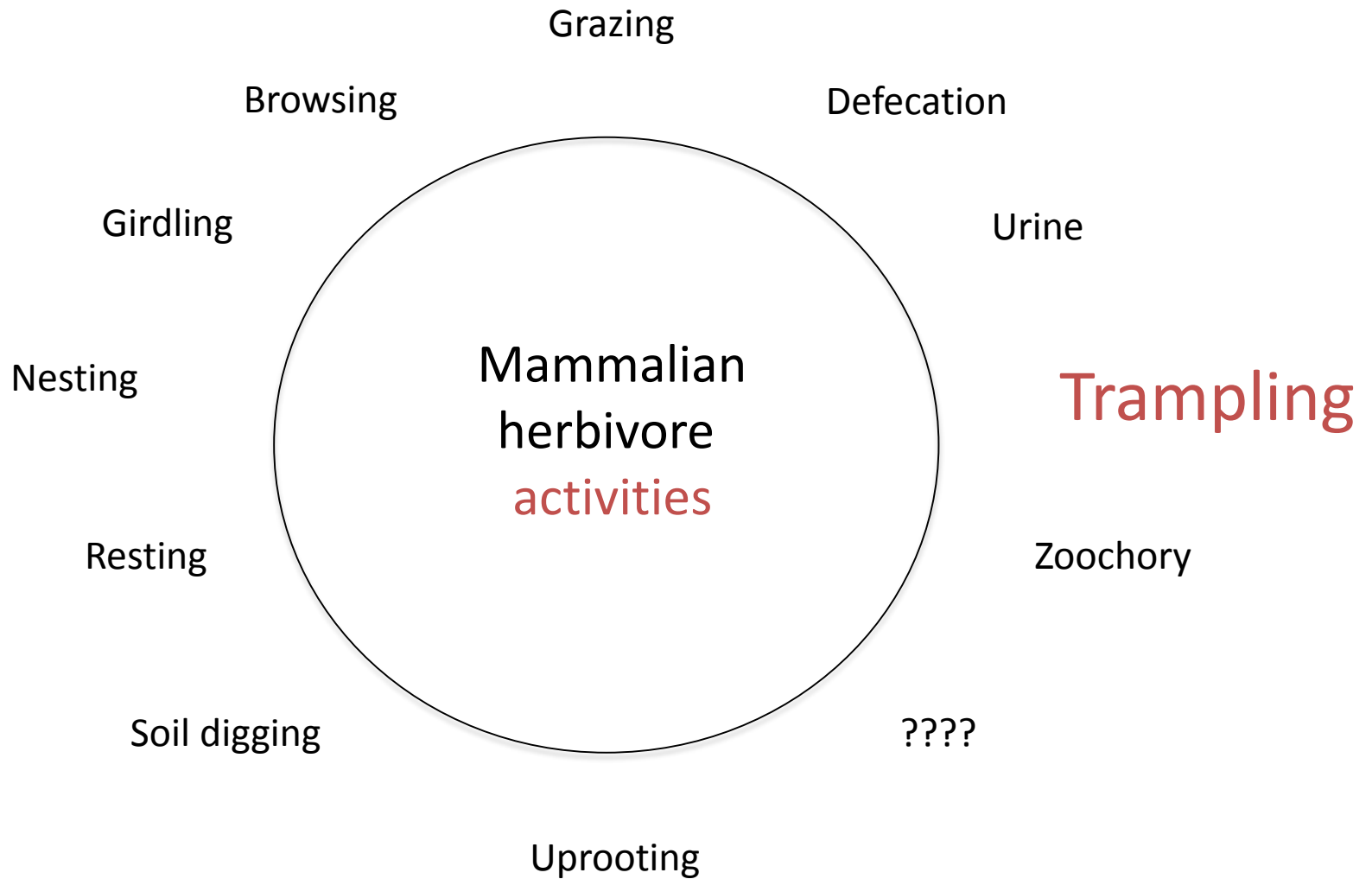
Herbivory – the eating of plants...





reindeer are “mixed feeders”
- affect competitive abilities of both
herbaceous and woody plants

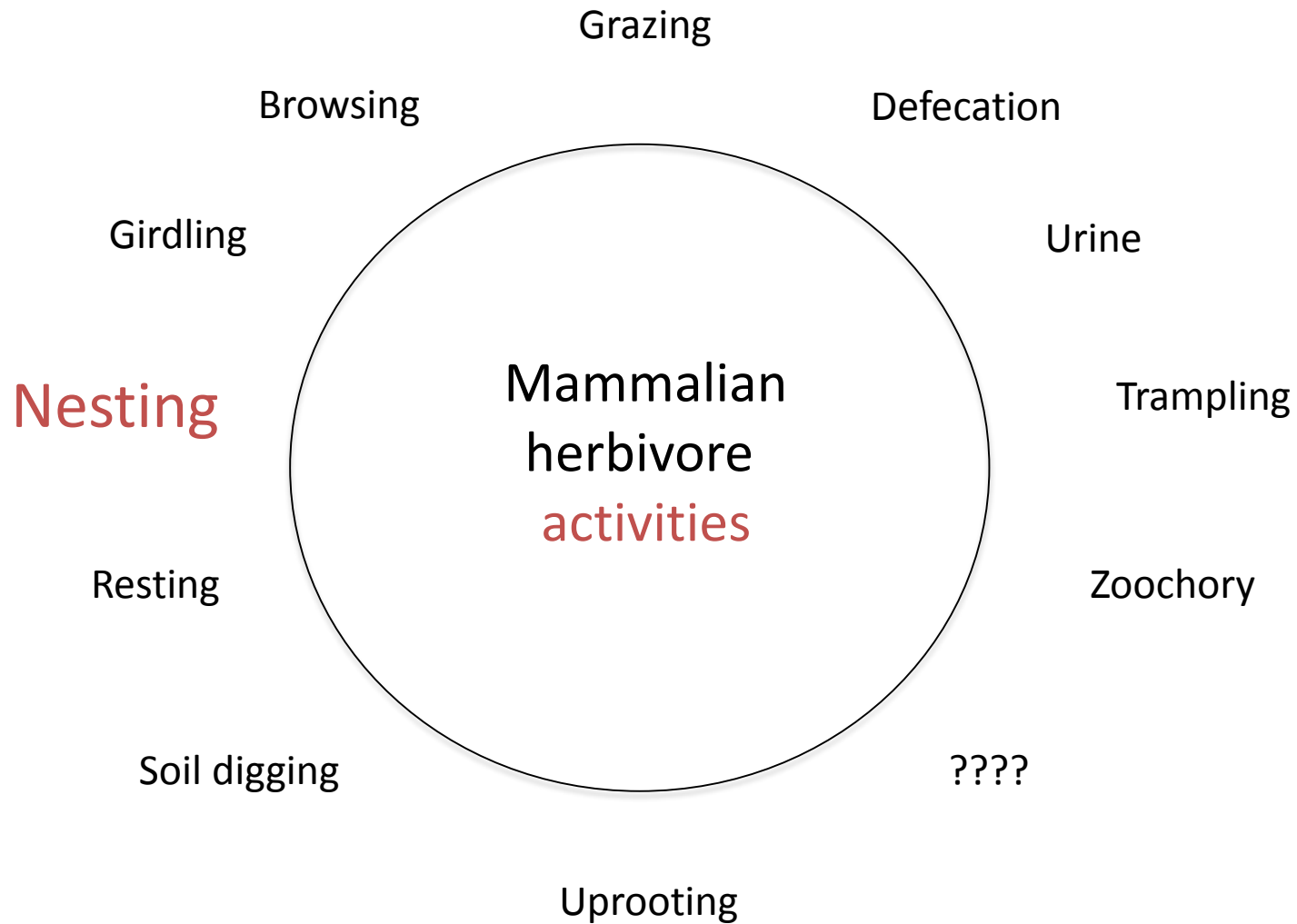
Herbivory – the eating of plants...





- damage to vegetation cover
- new opportunities for species to germinate and grow

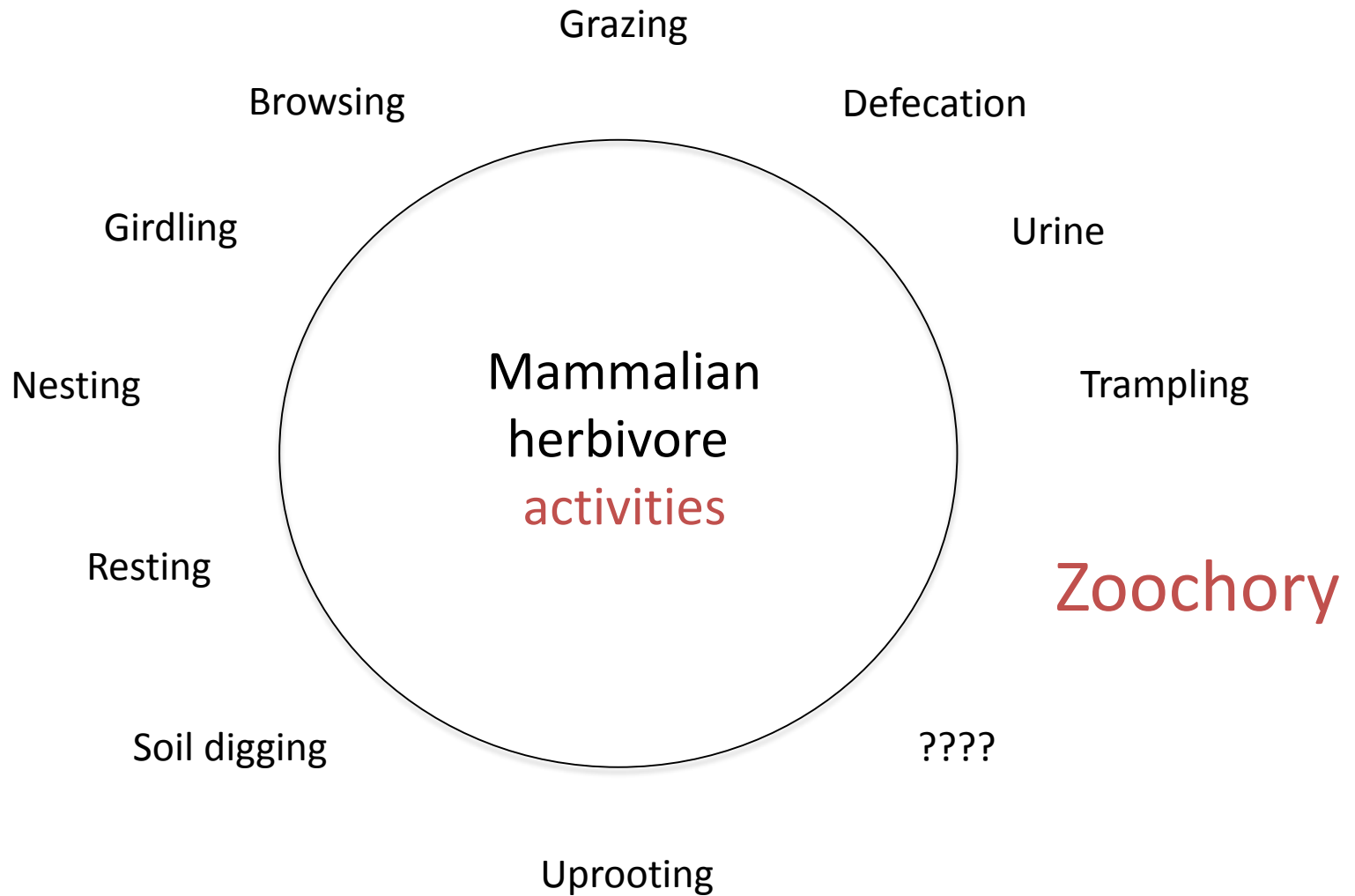
Herbivory – the eating of plants...



Nesting
and
winter grazing/activities



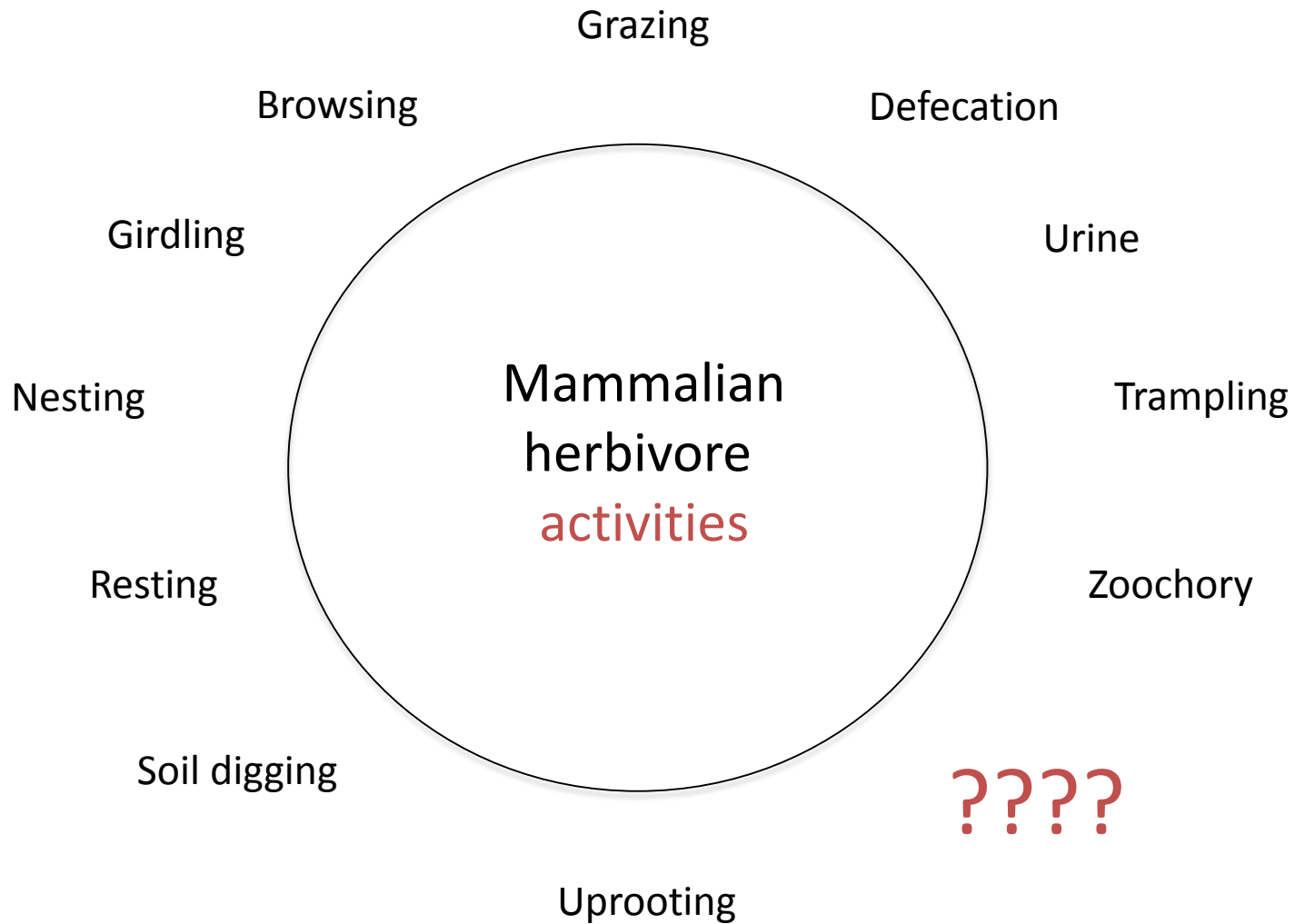
Herbivory – the eating of plants...





←
Seedlings of
herbaceous plants
germinates in reindeer
faeces

Herbivory – the eating of plants...

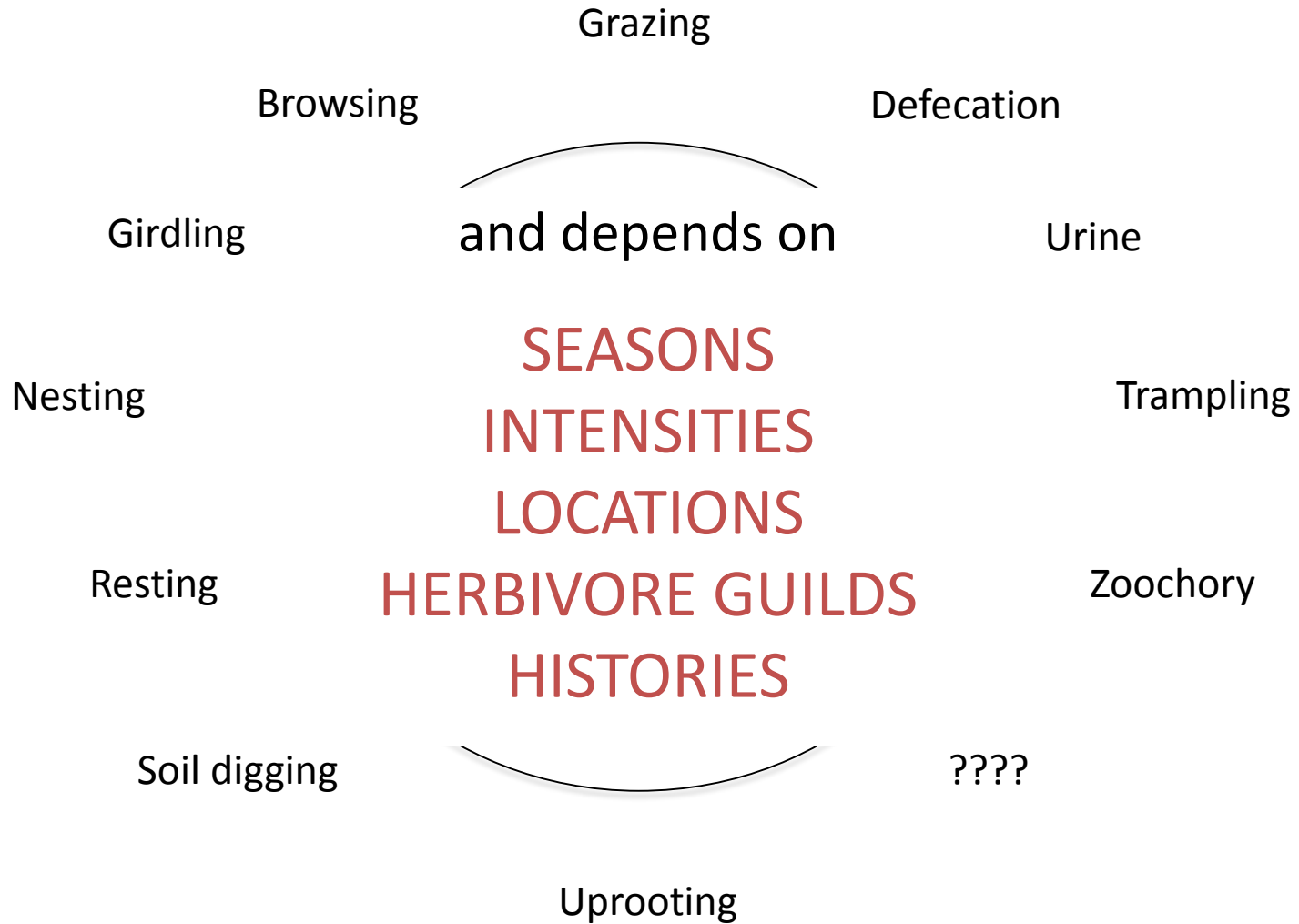




Carcasses

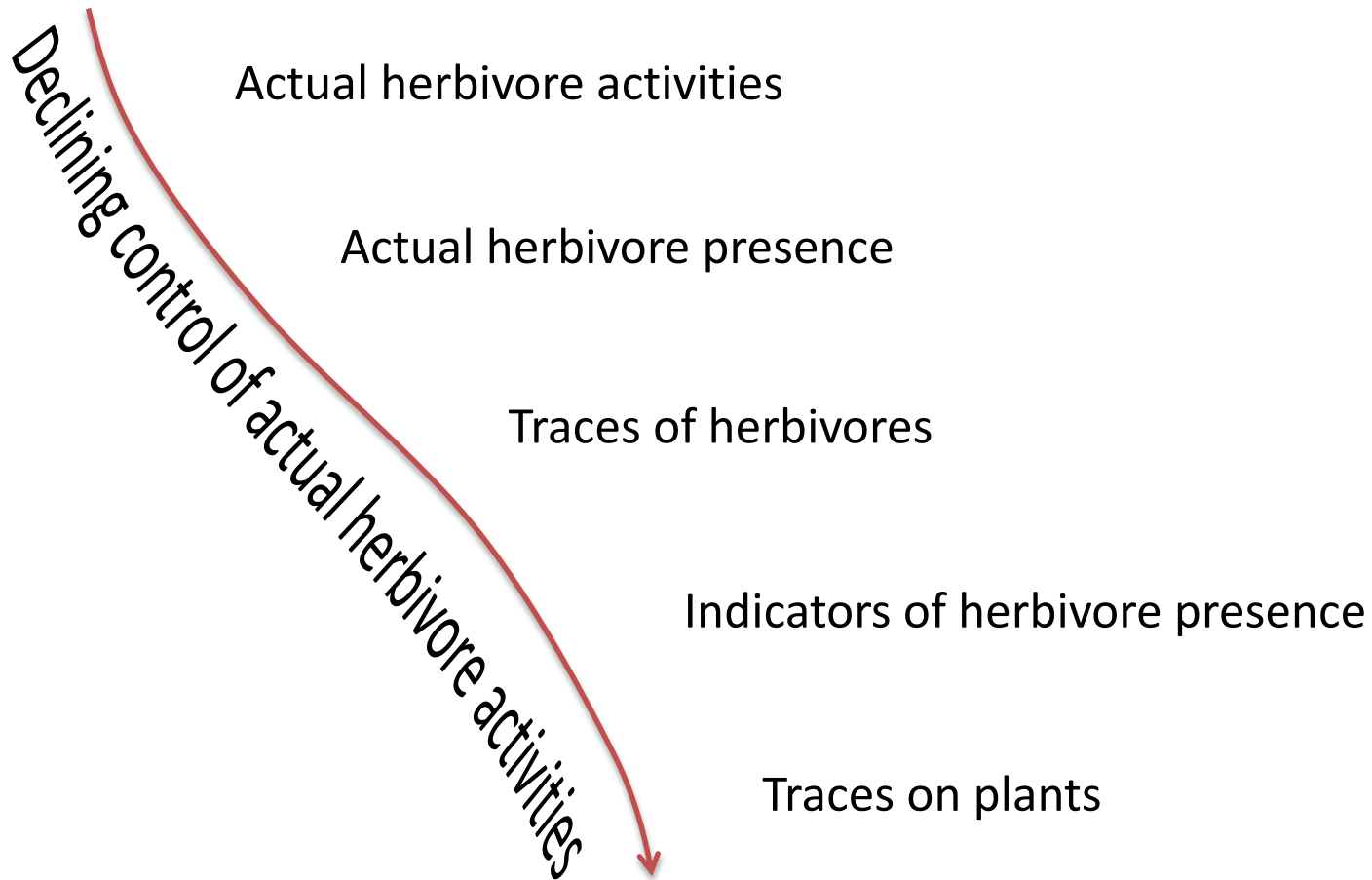
Photo Eeva Soinen

Herbivory activities



Ways to observe and register herbivore activities

Ask a zoologist....



Ways to observe and register herbivore activities

Ask a zoologist....

Actual herbivore activities

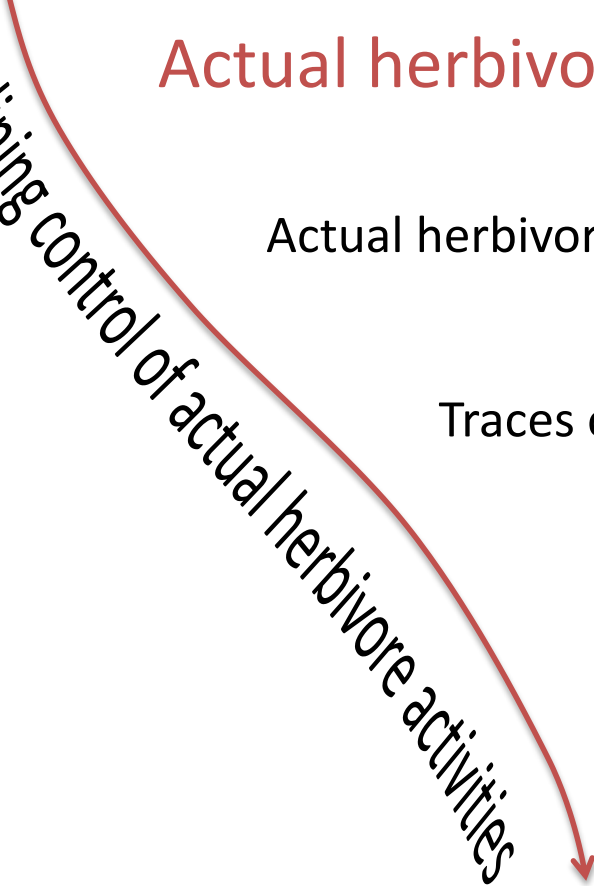
Actual herbivore presence

Traces of herbivores

Indicators of herbivore presence

Traces on plants

Declining control of actual herbivore activities





GPS

Photo Dylan Karter



Photo Leif Einar Støvern

Ways to observe and register herbivore activities

Ask a zoologist....

Actual herbivore activities

Actual herbivore presence

Traces of herbivores

Indicators of herbivore presence

Traces on plants

Declining control of actual herbivore activities

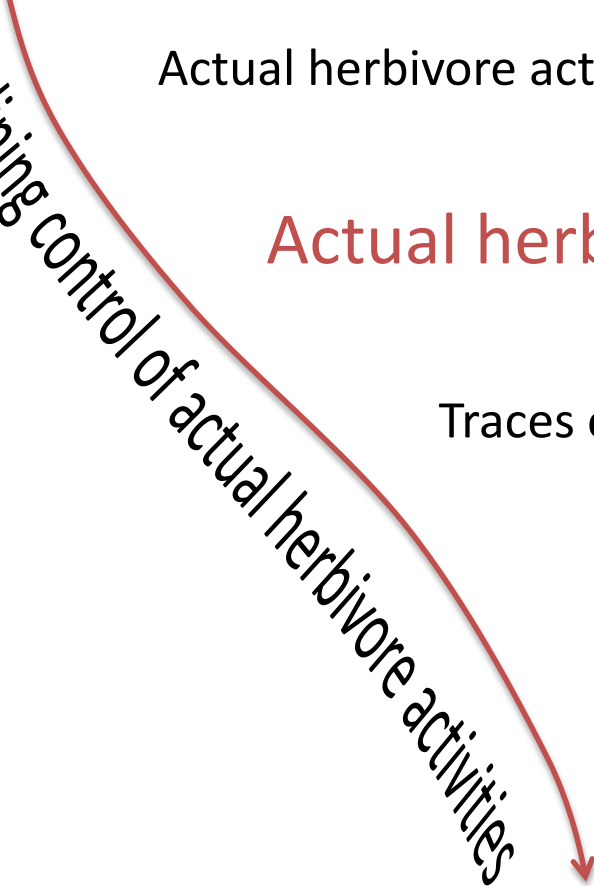




Photo Geir Rudolfson



Photo John-André Henden

Ways to observe and register herbivore activities

Ask a zoologist....

Actual herbivore activities

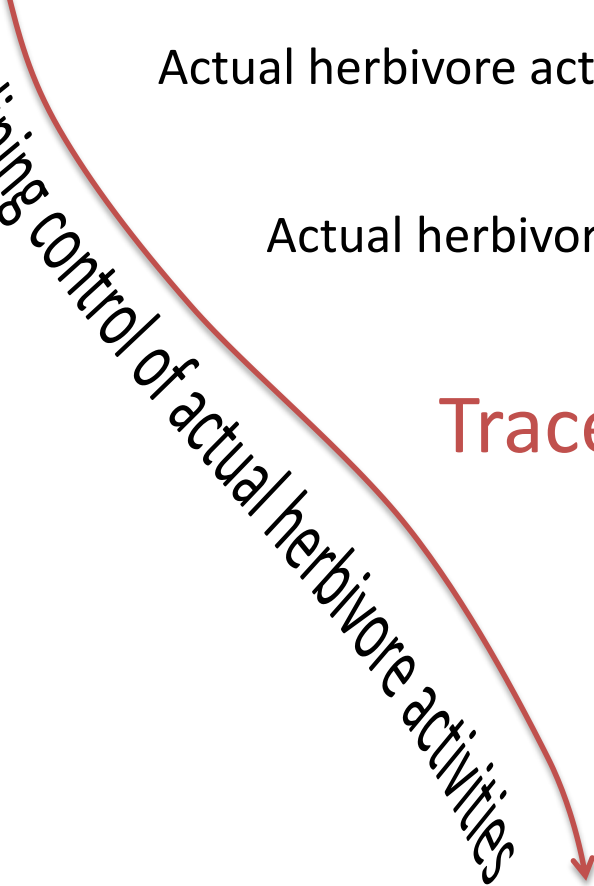
Actual herbivore presence

Traces of herbivores

Indicators of herbivore presence

Traces on plants

Declining control of actual herbivore activities



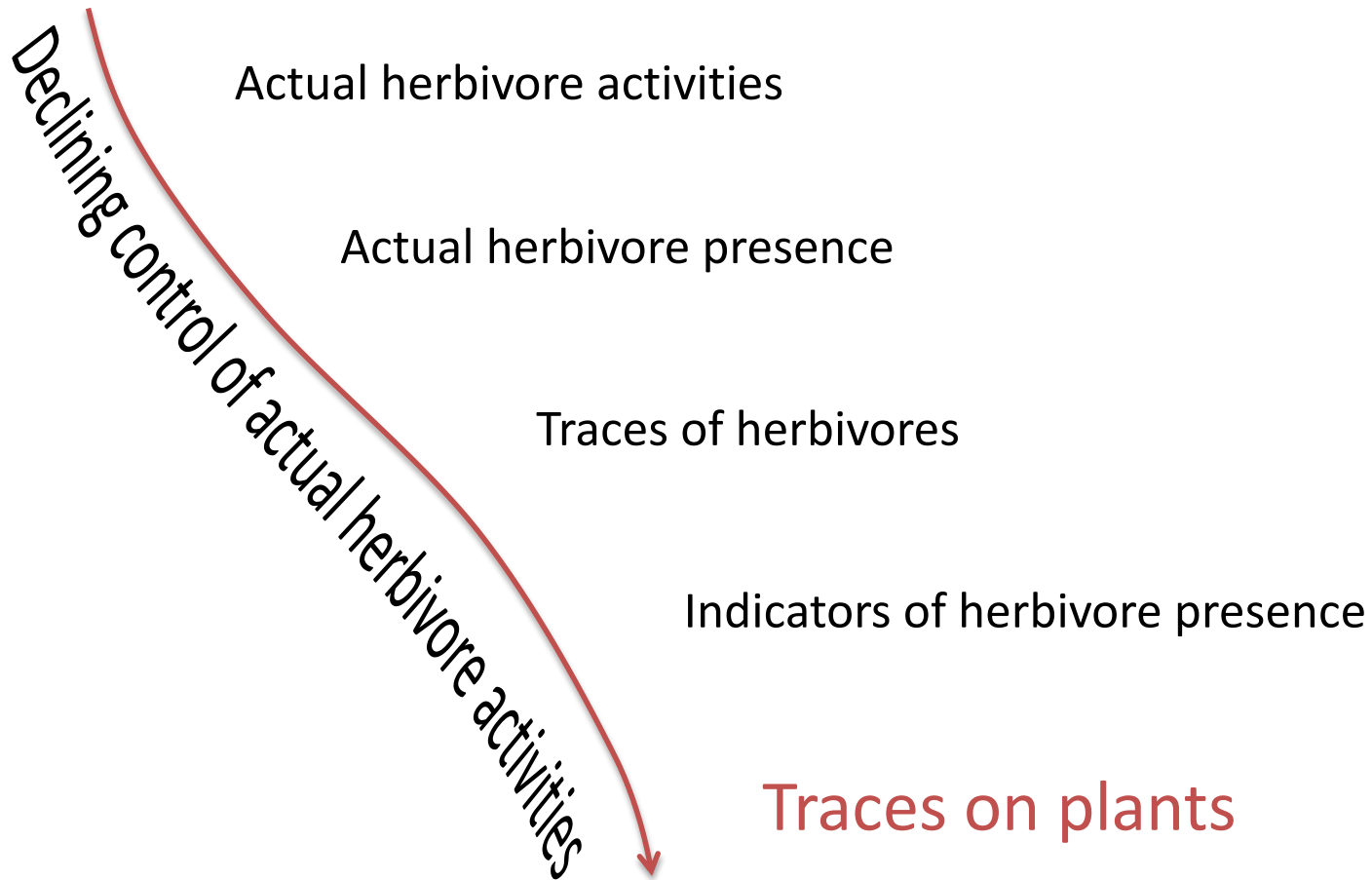


Small rodents...but which species?



Ways to observe and register herbivore activities

Ask a zoologist....

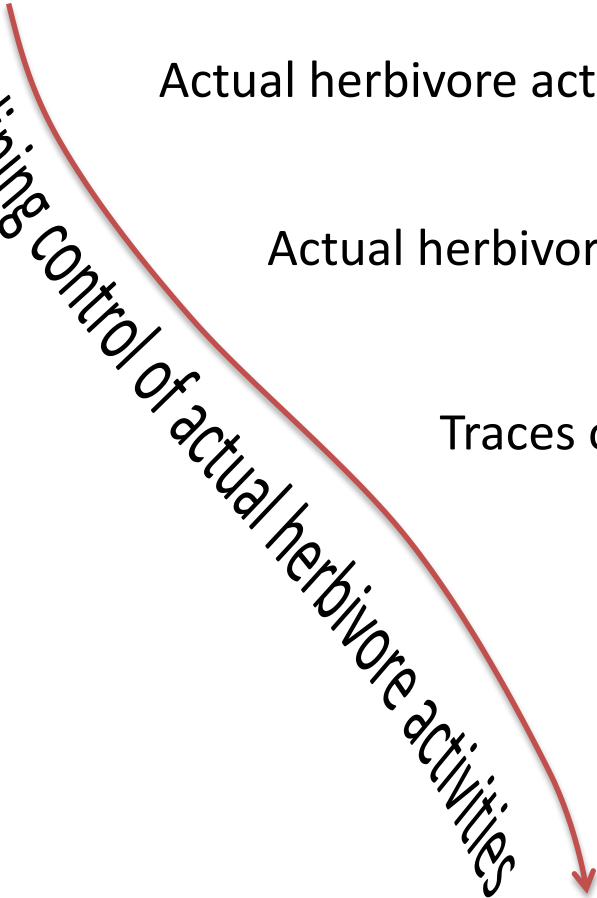




Ways to observe and register herbivore activities

Ask a zoologist....

Declining control of actual herbivore activities



Actual herbivore activities

Actual herbivore presence

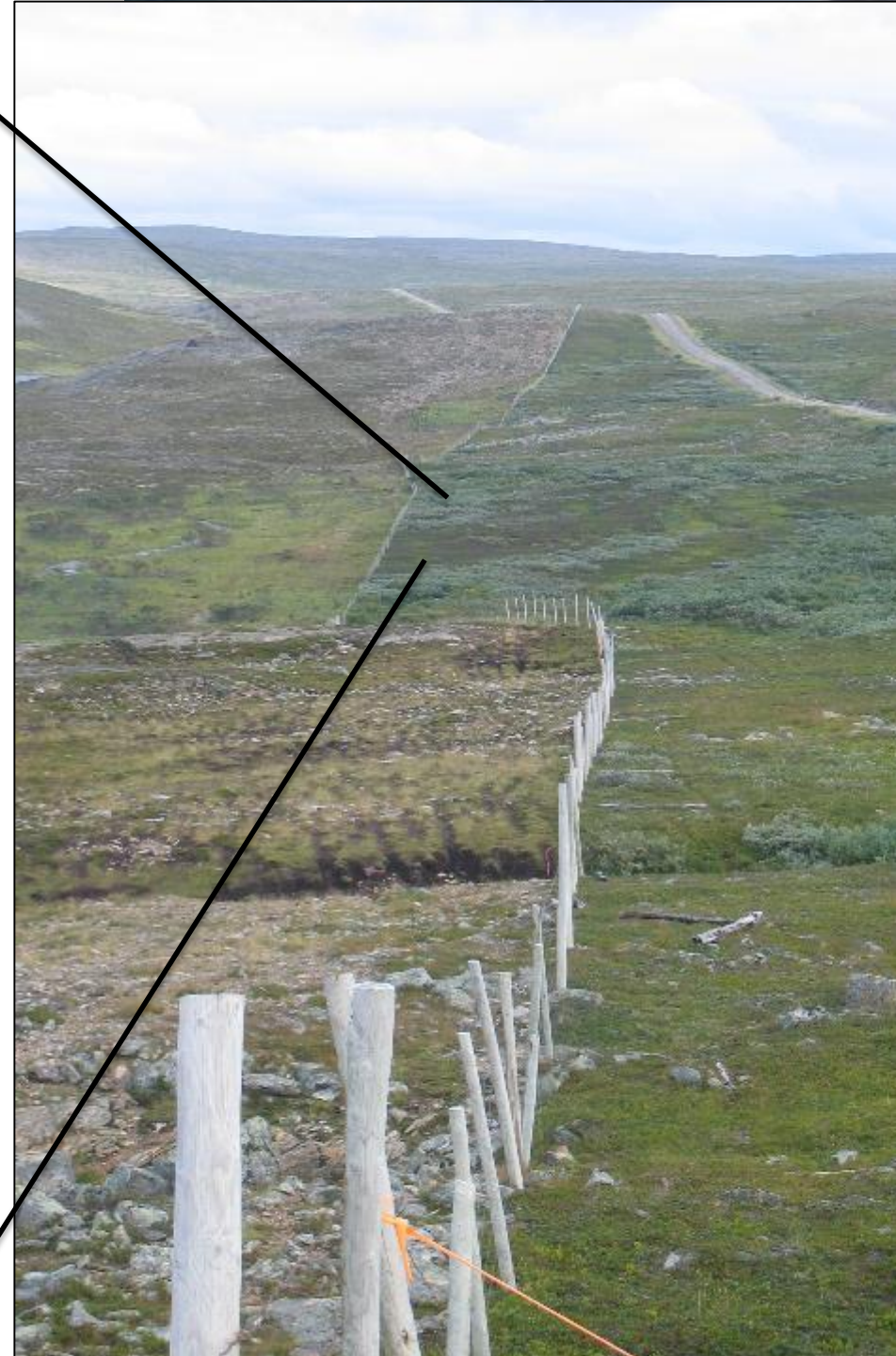
Traces of herbivores

Indicators of herbivore presence

Traces on plants

Manipulate
herbivore
presence





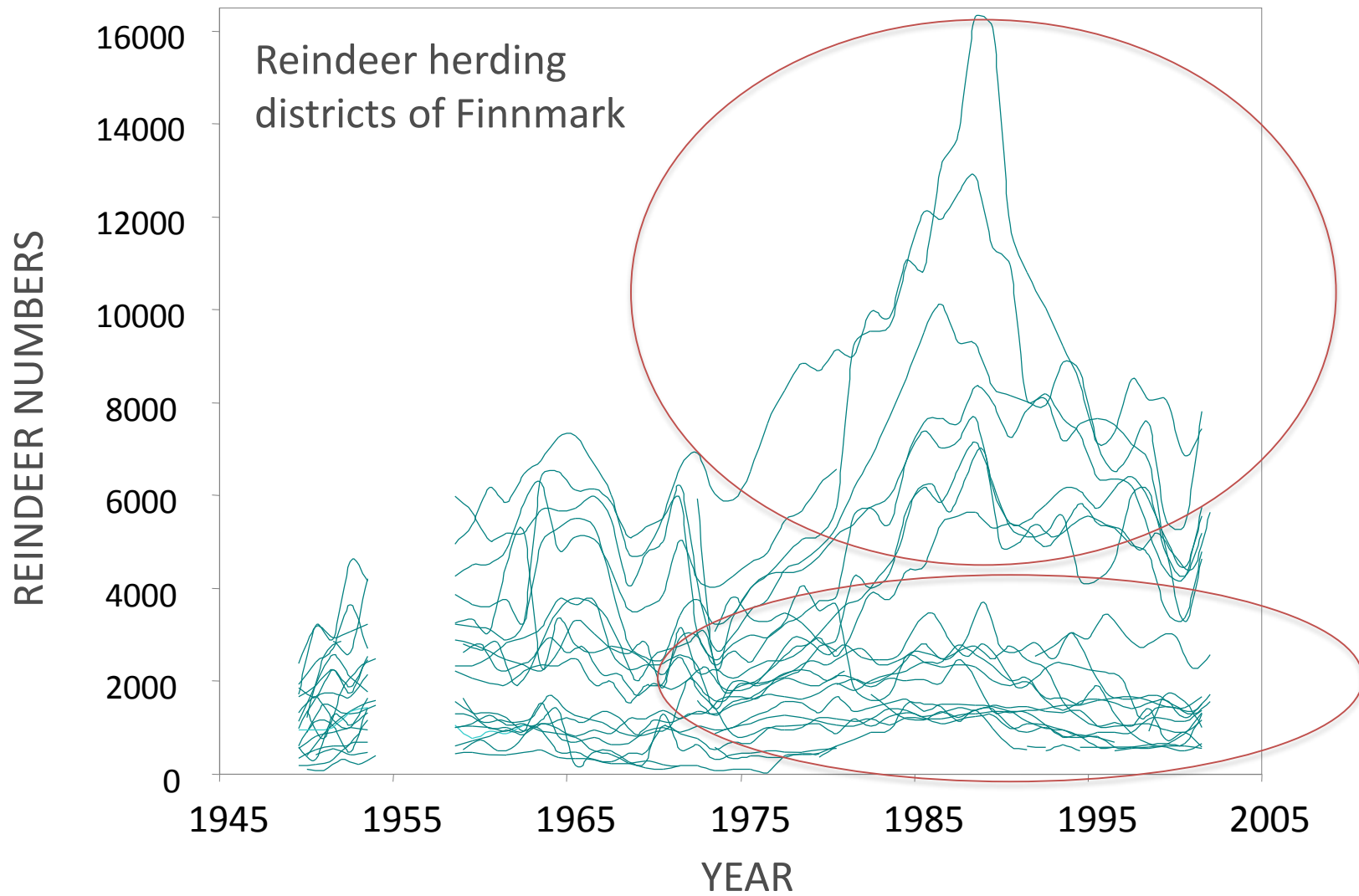
Example of the use of traces of herbivores:

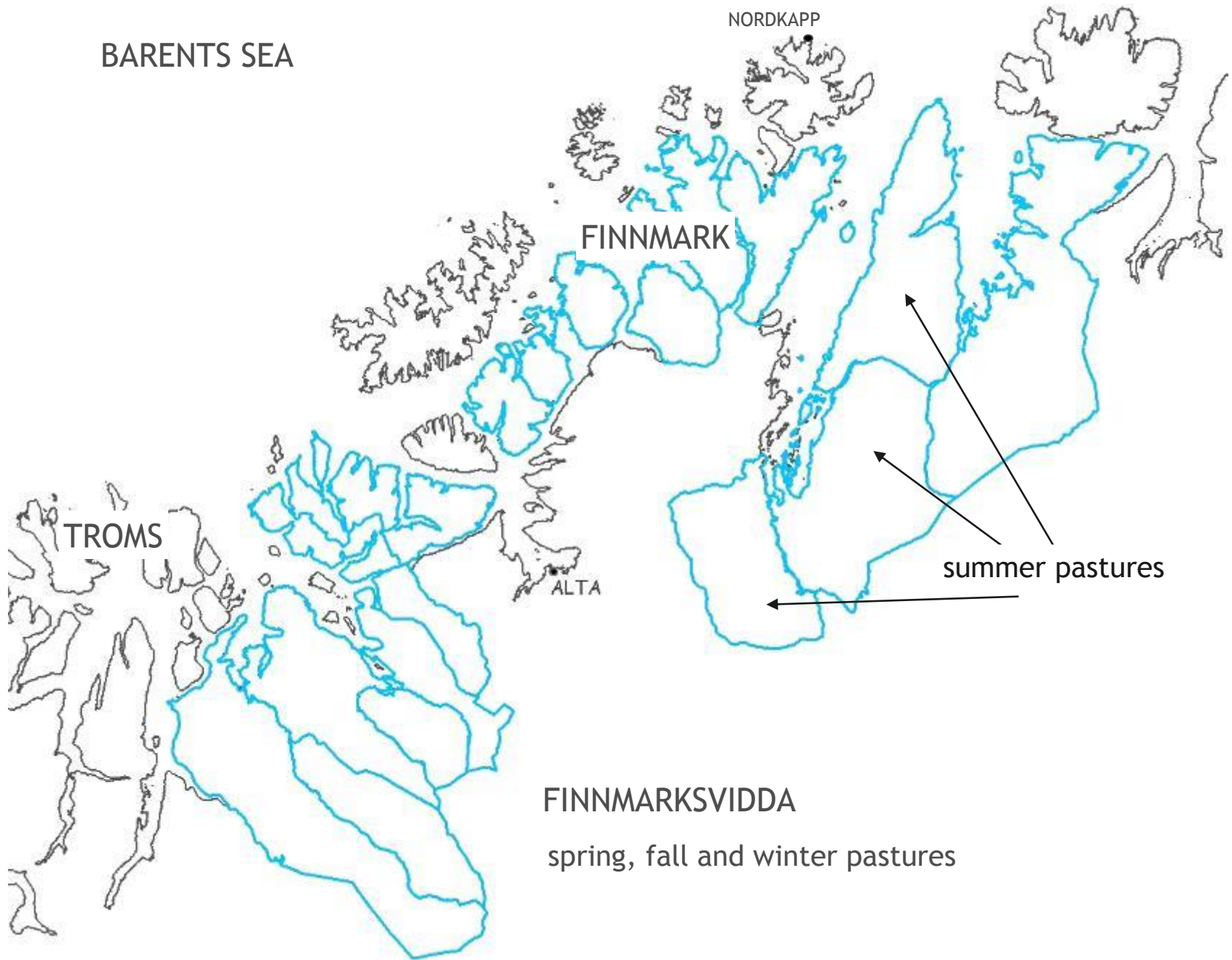
Faeces as indicators of herbivory by reindeer

Successfully used to assess vegetation changes at different scales, between and within reindeer district

Between → larger scale

Within → smaller scale (still large...)





BARENTS SEA

NORDKAPP

FINNMARK

TROMS

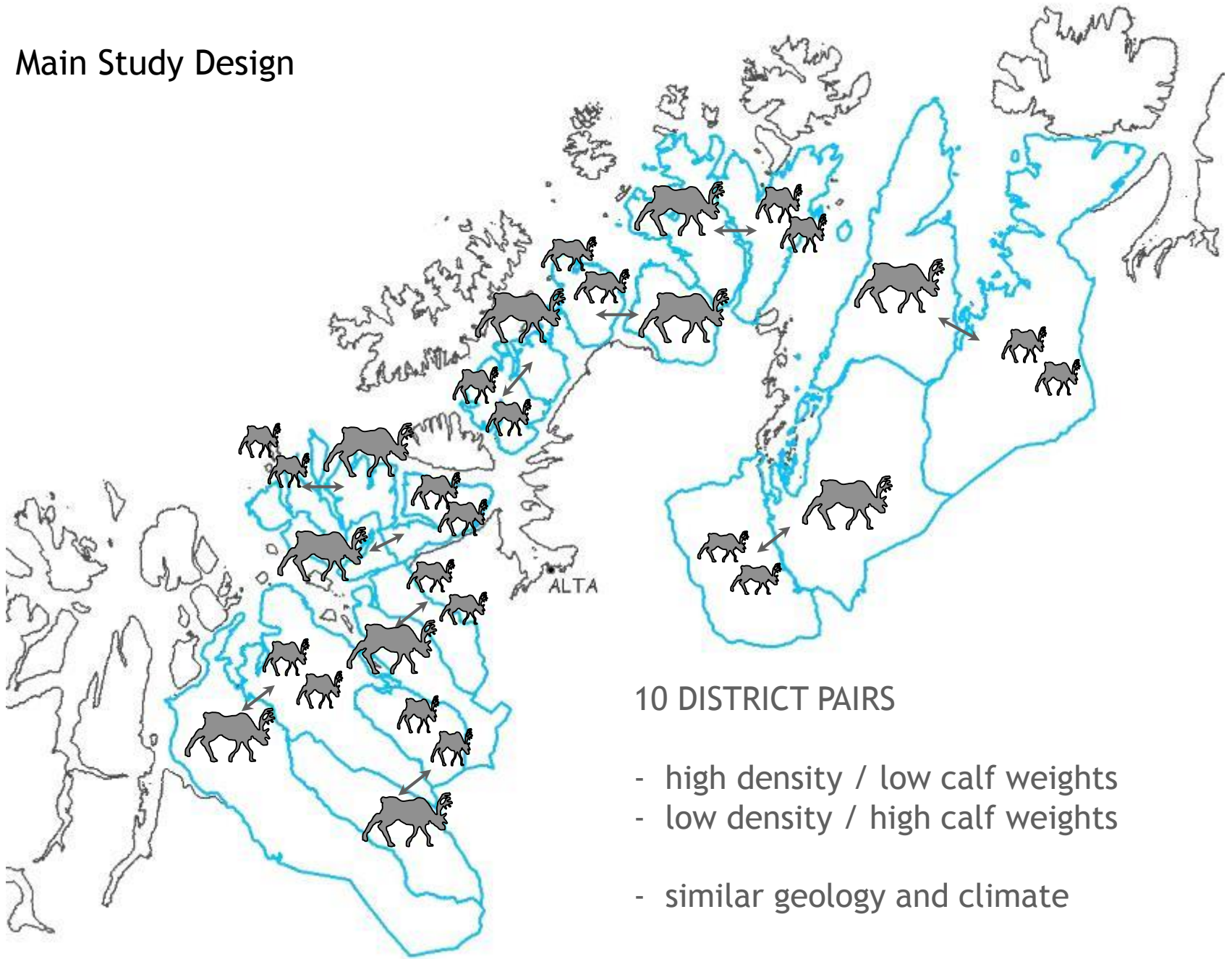
ALTA

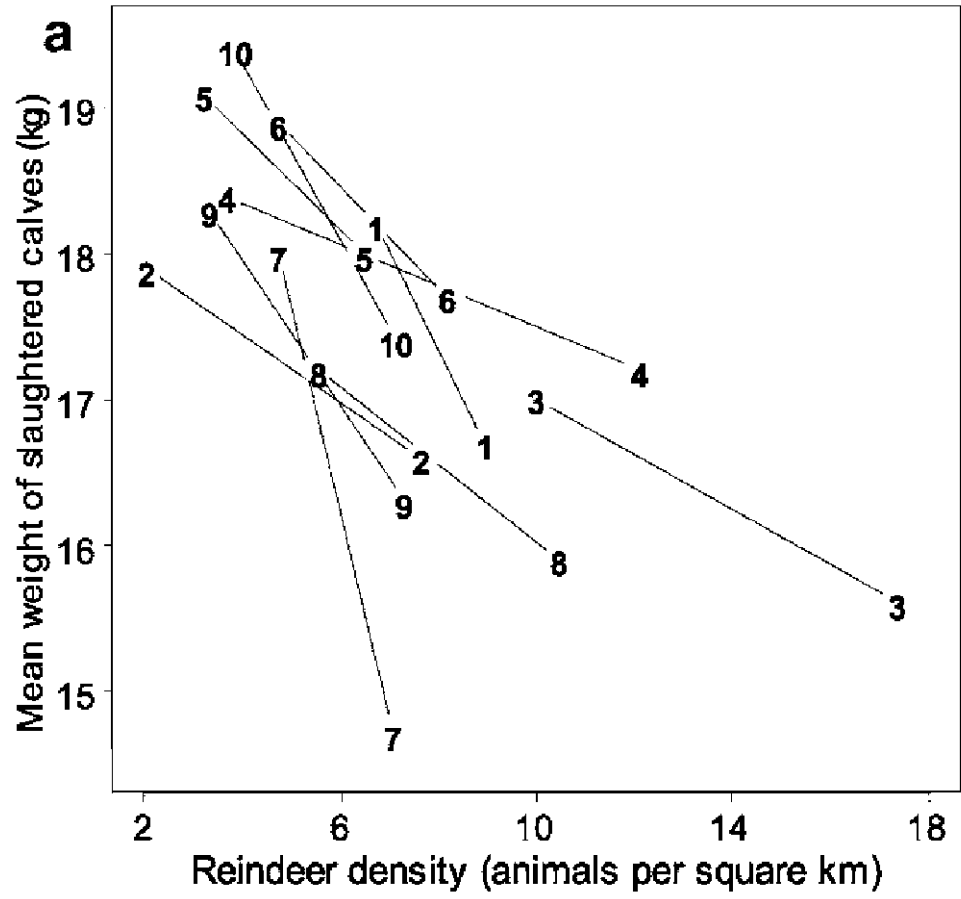
summer pastures

FINNMARKSVIDDA

spring, fall and winter pastures

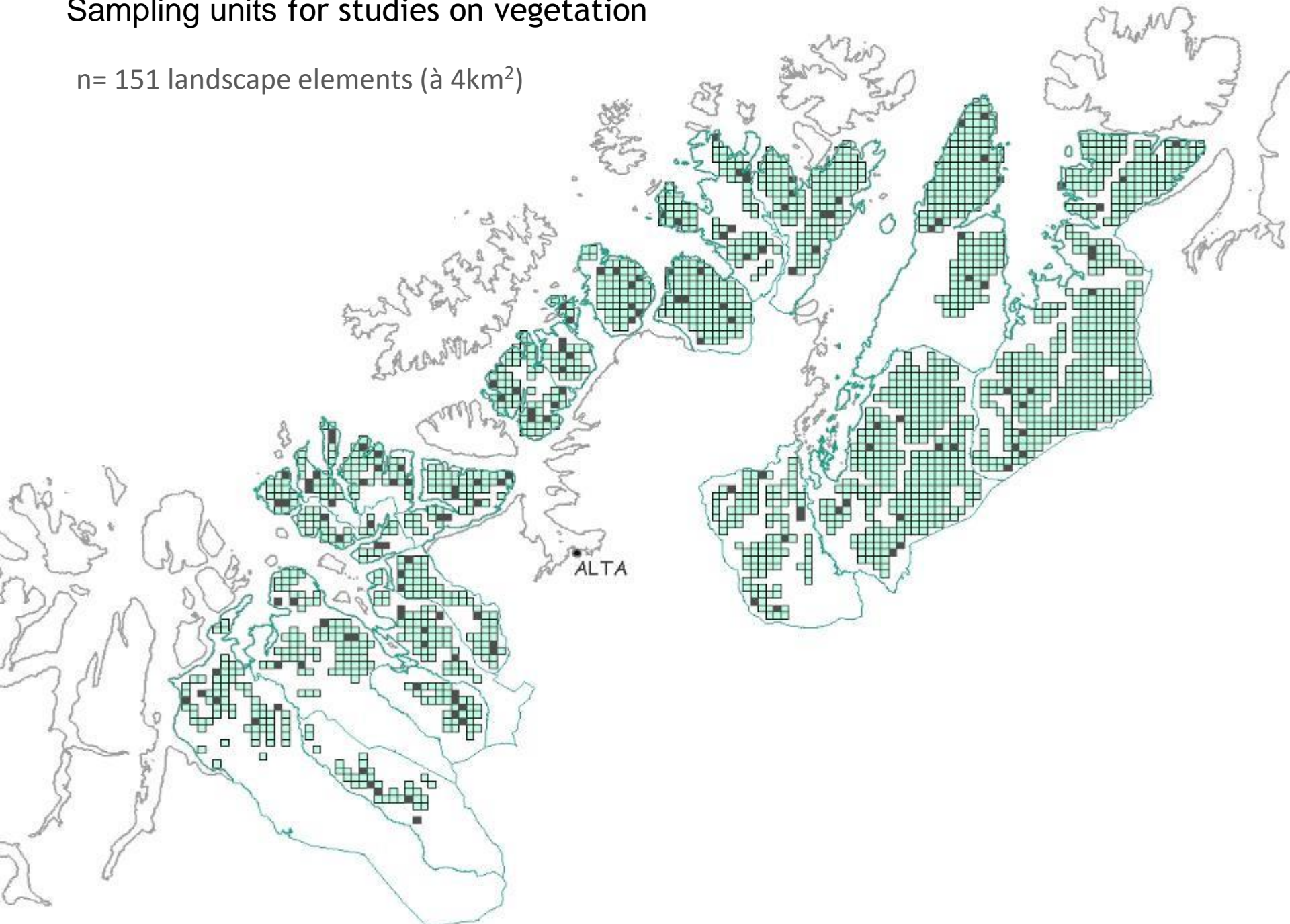
Main Study Design

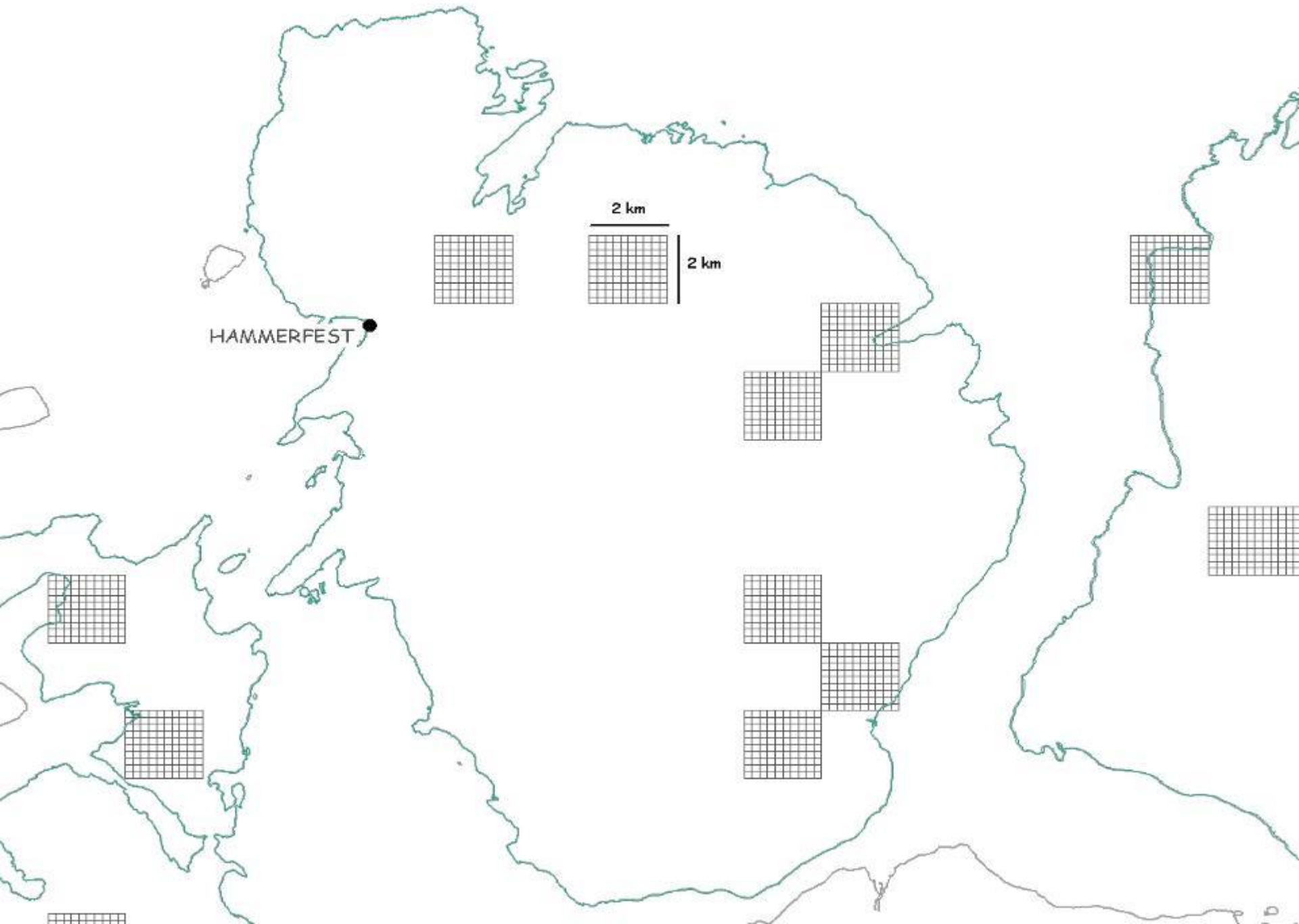




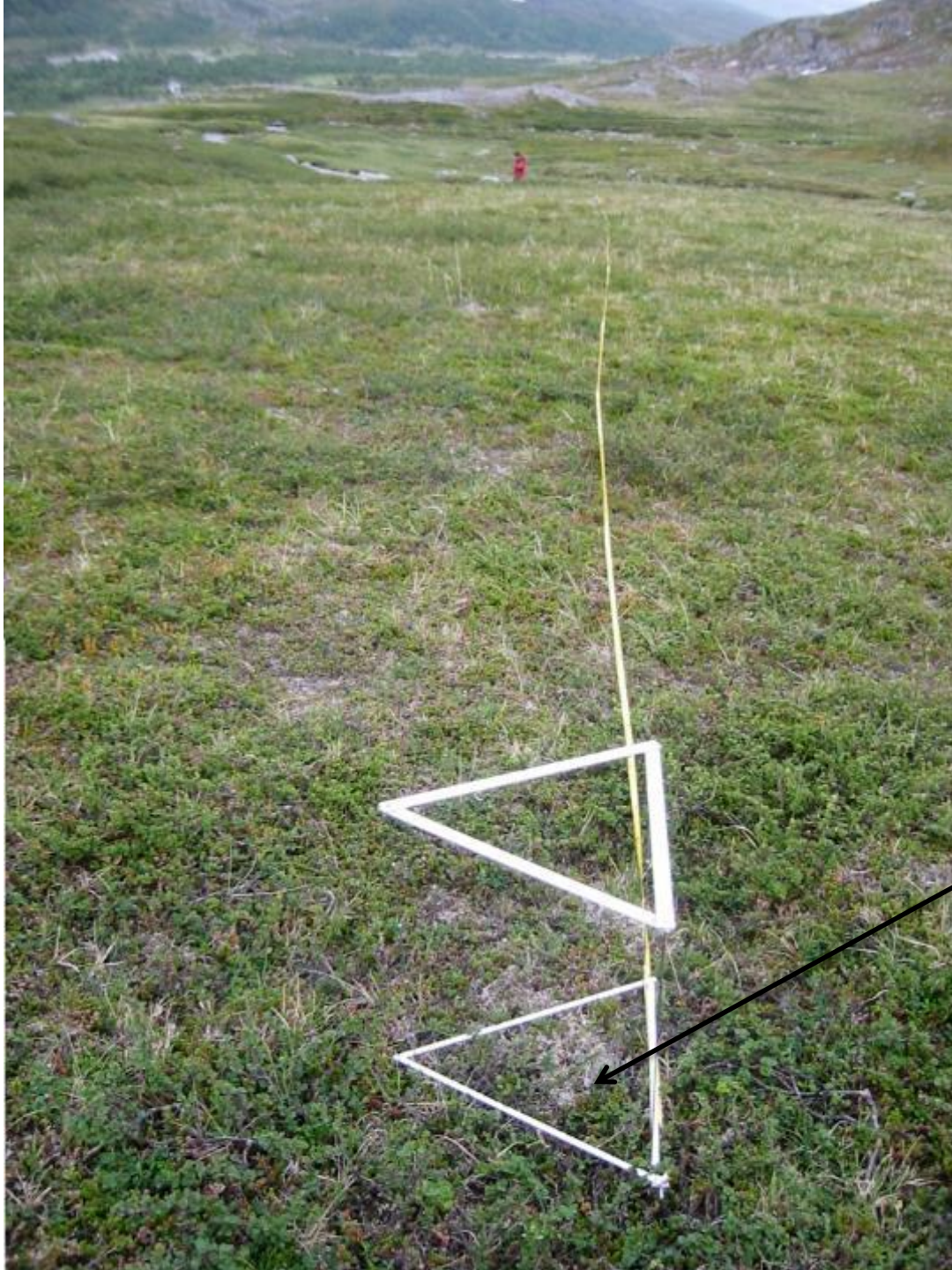
Sampling units for studies on vegetation

n= 151 landscape elements (à 4km²)

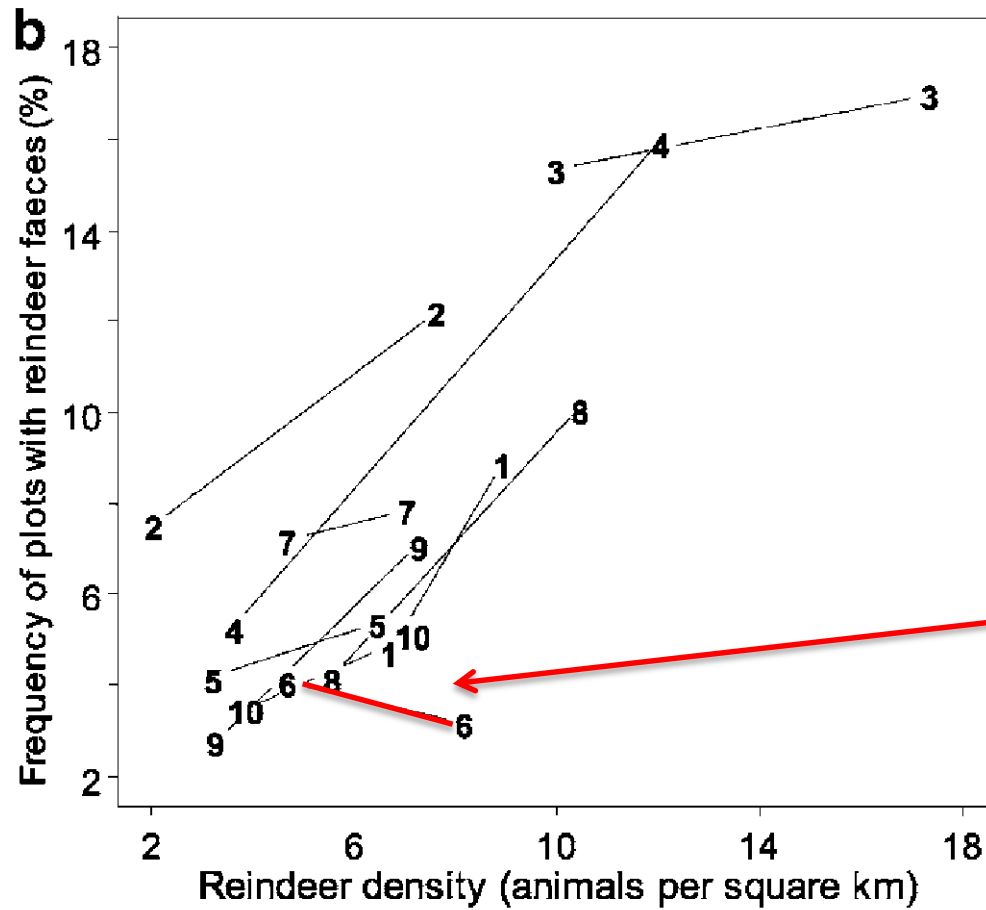








Presence
of faeces
recorded



Official numbers
last 4 years says
this is correct

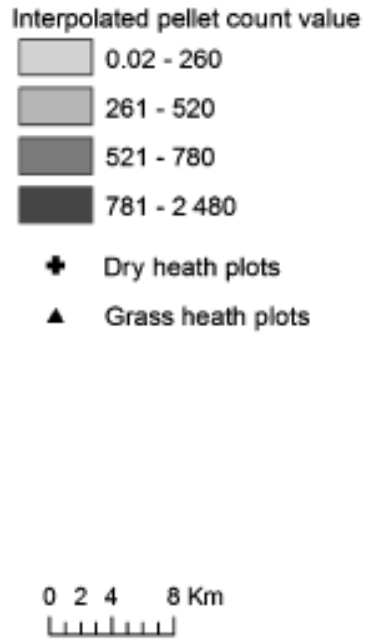
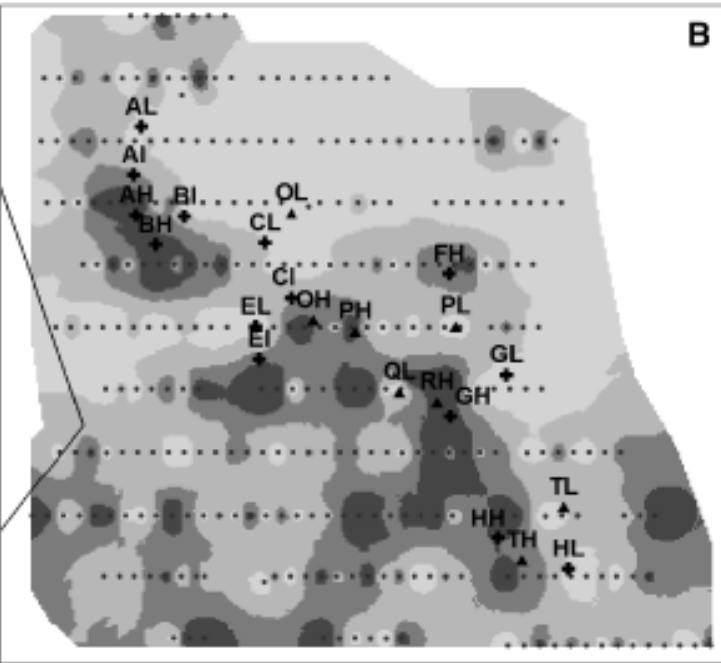
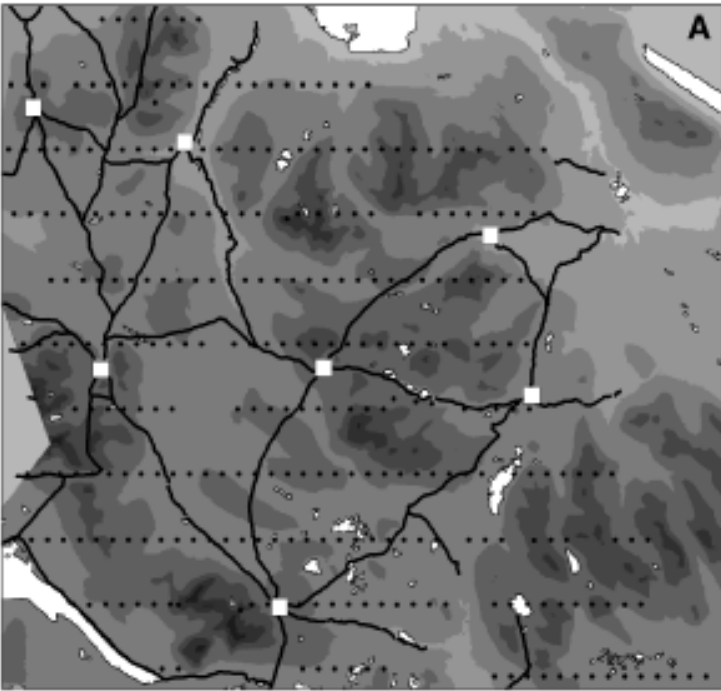
Example of the use of traces of herbivores:

Faeces as indicators of herbivory by reindeer

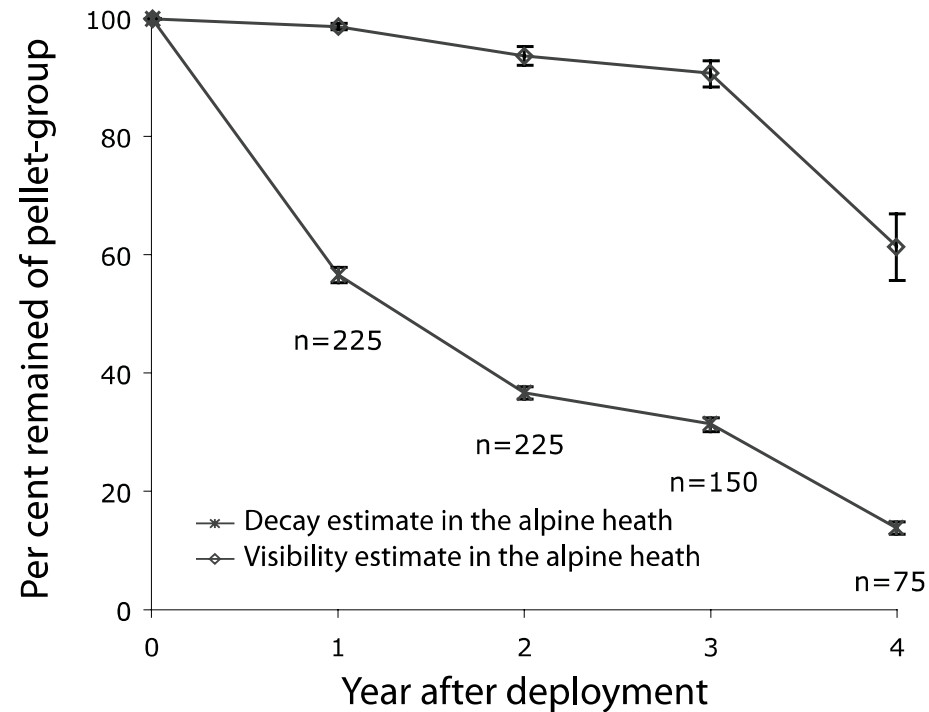
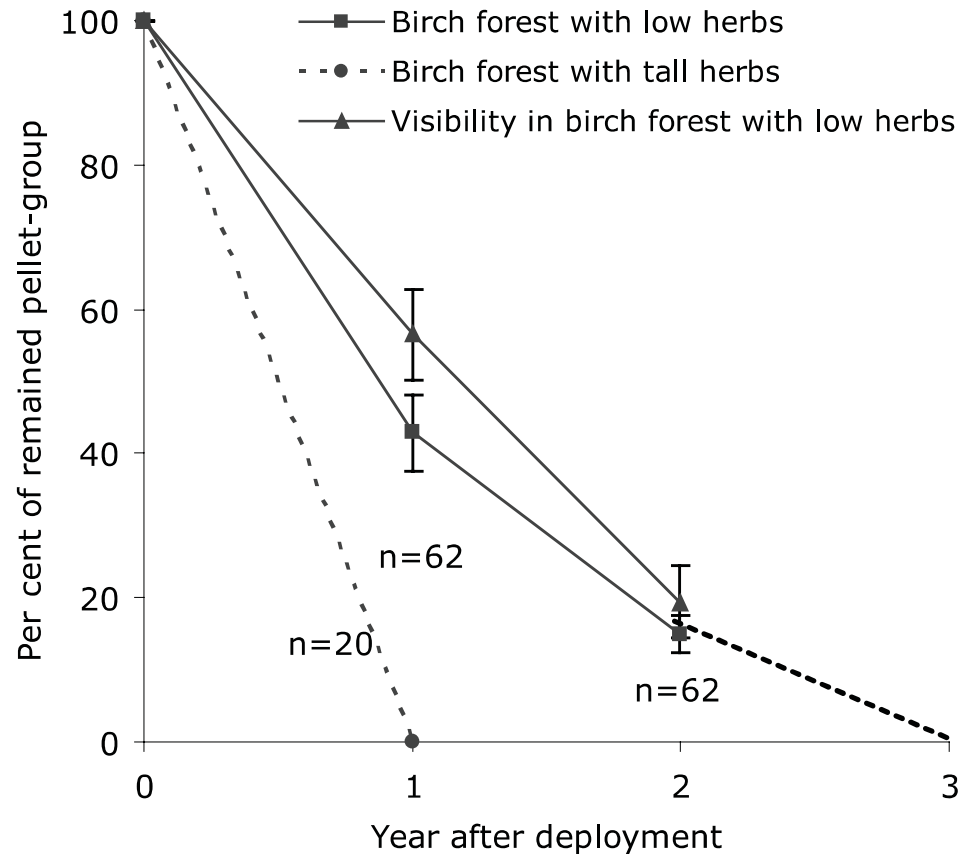
Successfully used to assess vegetation changes at different scales, between and within reindeer district

Between → larger scale

Within → smaller scale (still large...)



Shit.... Decay rates are dependent on vegetation types
→ use of faeces challenging



Shit.... !

Pragmatic approach for circumpolar comparisons

CONS

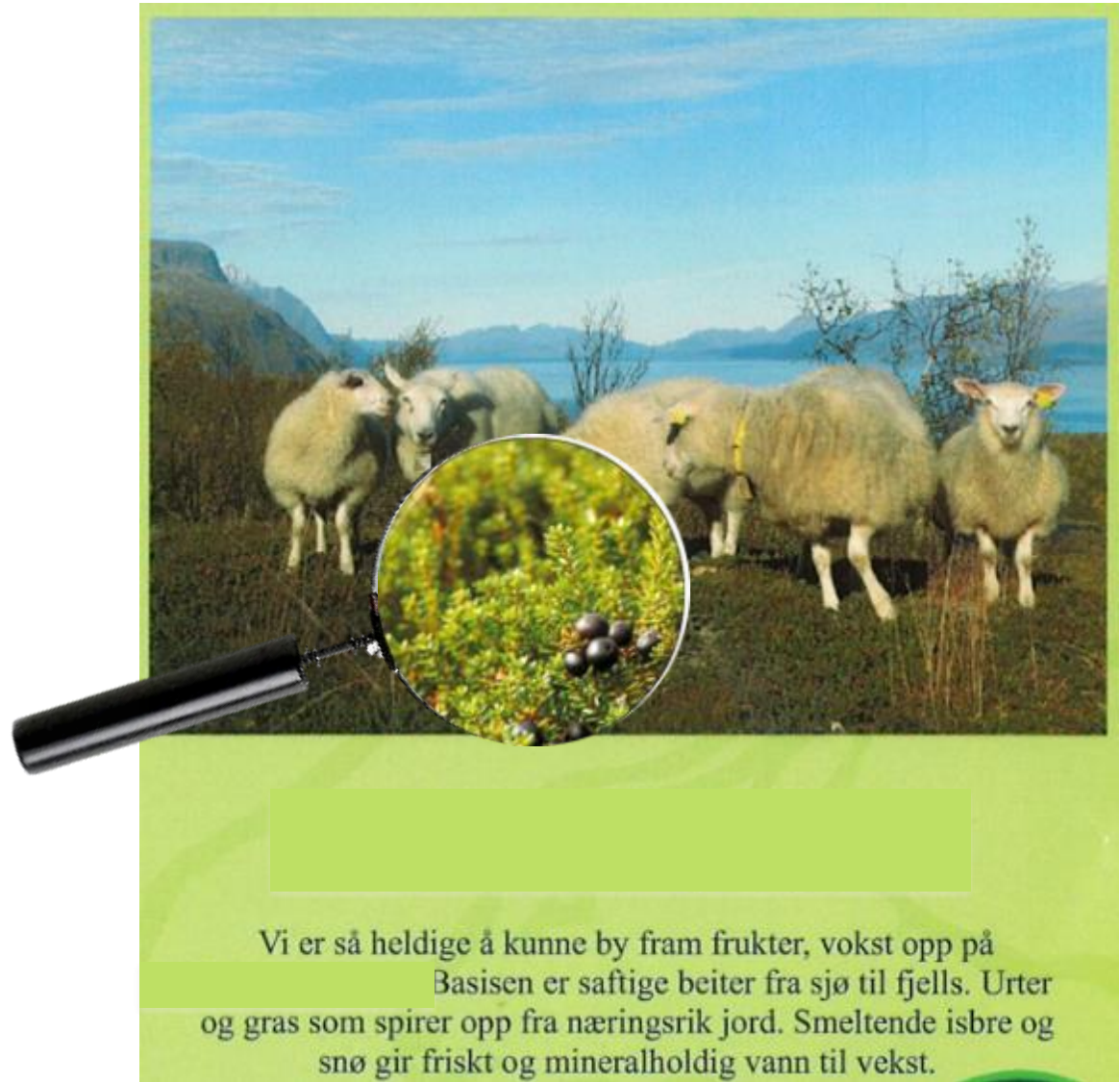
- recent – short history
- does not say specific activities
- persistence depending on climate and weather
- faeces found ...summer or winter herbivory?, when?
- faeces found does not say other activity in locality

PROs

- can indicate species and species guild presence - ...DNA
- almost always available
- easy? to register for botanists
- can indicate intensity and extent
- can indicate when (FAR method; faeces removal and accumulation)

Commercial Folder For Lamb Meat

«We are so fortunate as to present fruits, grown in
The basis is juicy pastures
From sea level to highlands.
Forbs and grasses
that grow in fertile soils.
Melting glacier and snow
provide fresh mineral
rich water for growth»



In the 90s there was a claim that reindeer do not affect their ecosystems in the long term

Jefferies et al 1994

No response because herbivory is not important?

- or because vegetation is adapted?
- or because sample size is too small?
- or because herbivory poorly estimated?
- or because response is a long term processes in arctic areas with perennial plants?

