

Interconnections of climate change, reindeer husbandry and other land use

Anna Skarin
Professor in Reindeer husbandry

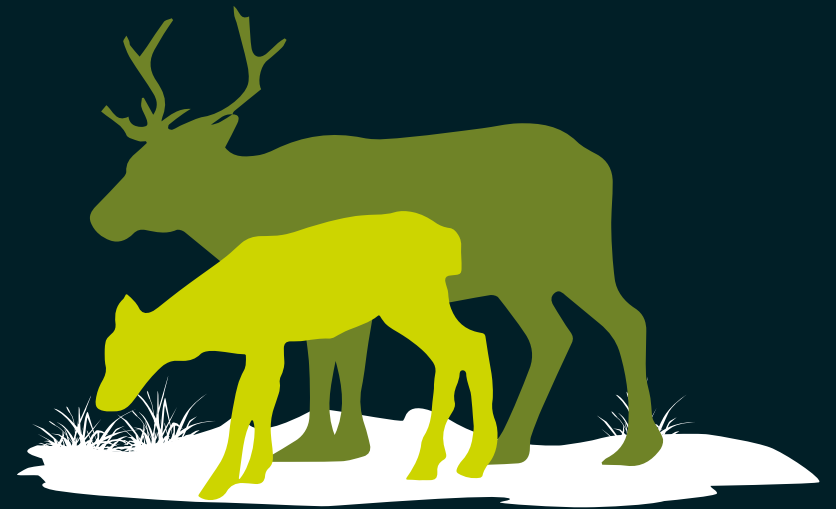
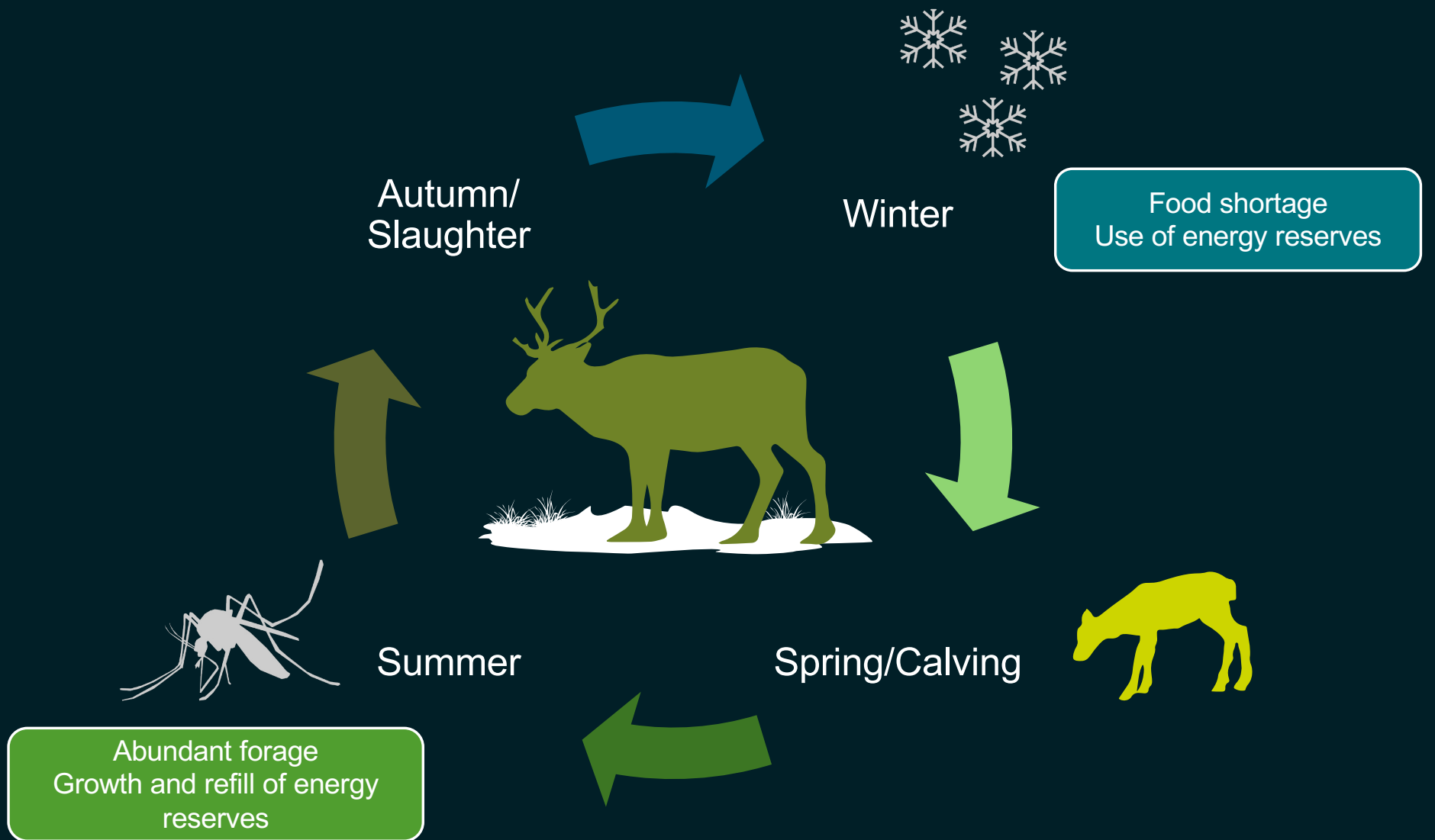


Illustration: Fredrik Saarkoppel, Tim Horstkotte



Reports from three projects

1. Wind power and reindeer husbandry
2. Reinfed - feeding reindeer for future free-range functionality
3. Reinforce - Production, land use and climate change



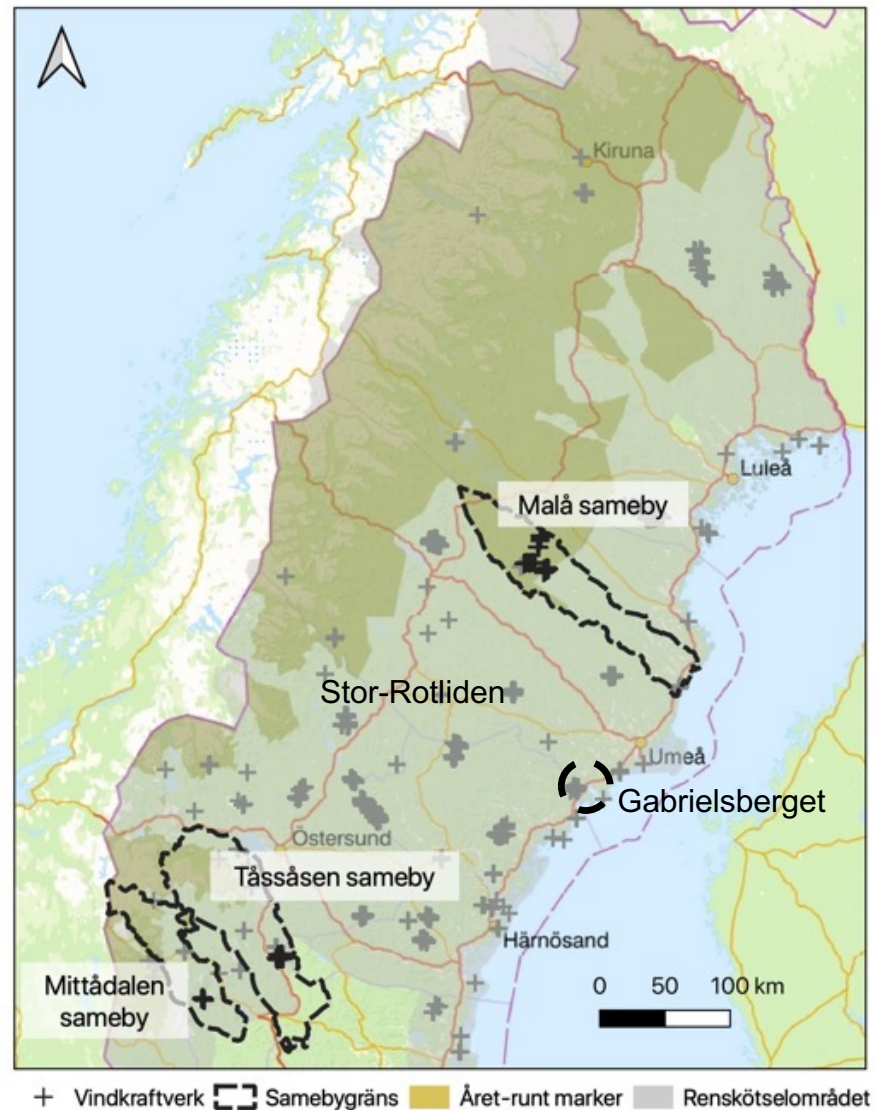
Wind power, reindeer and reindeer husbandry

Anna Skarin, Bernardo Brandão Niebuhr, Per Sandström, Sven Adler, Moudud Alam

Cumulative impacts

Samebyar and study areas involved in the projects

- Mittådalen sameby
- Tåssåsen sameby
- Malå sameby
- Vilhelmina Norra sameby



How is reindeer affected?

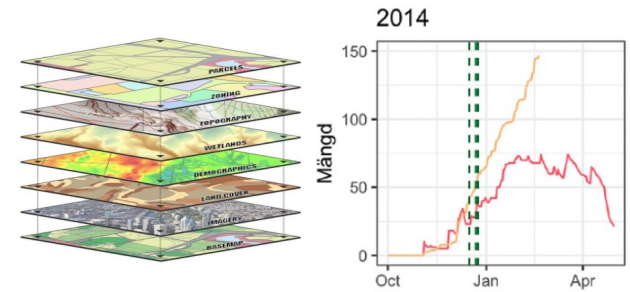
Qualitative data



GPS-data



Quantitative data

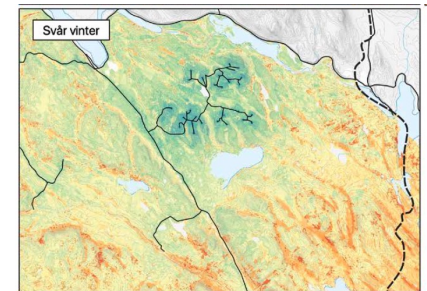


Interpretation of results
together with herders

Resource selection models
at 2nd and 3rd order

Analysis of movement rate

Predicted probability of use
and predicted movement rate



Mittådalens sameby

- "Vålarna" are very important during severe winters
- Samebyn have stopped using the area

"Men det är ingen idé att lägga pengar och krut på att skicka upp dem hit, för du vet att dom far ner igen.... Nej en vecka kan man väl stå och hålla men sedan är de ju nere igen."



Lavbete i Glötesvålen vindkraftpark, Mittådalens sameby

Results

Autumn

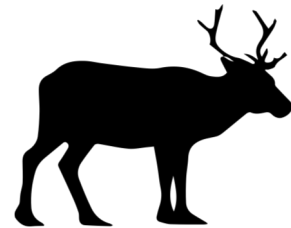
- Decreased use of mires and forests
- No increase in movement rate
- Avoidance of mines, large roads

Autumn/
Slaughter

Winter

Winter

- Increased work load for reindeer herders
- Reindeer herders stopped using the area
- Increased movement rate with sound
- Elevated and varied terrain important during severe winters



Summer

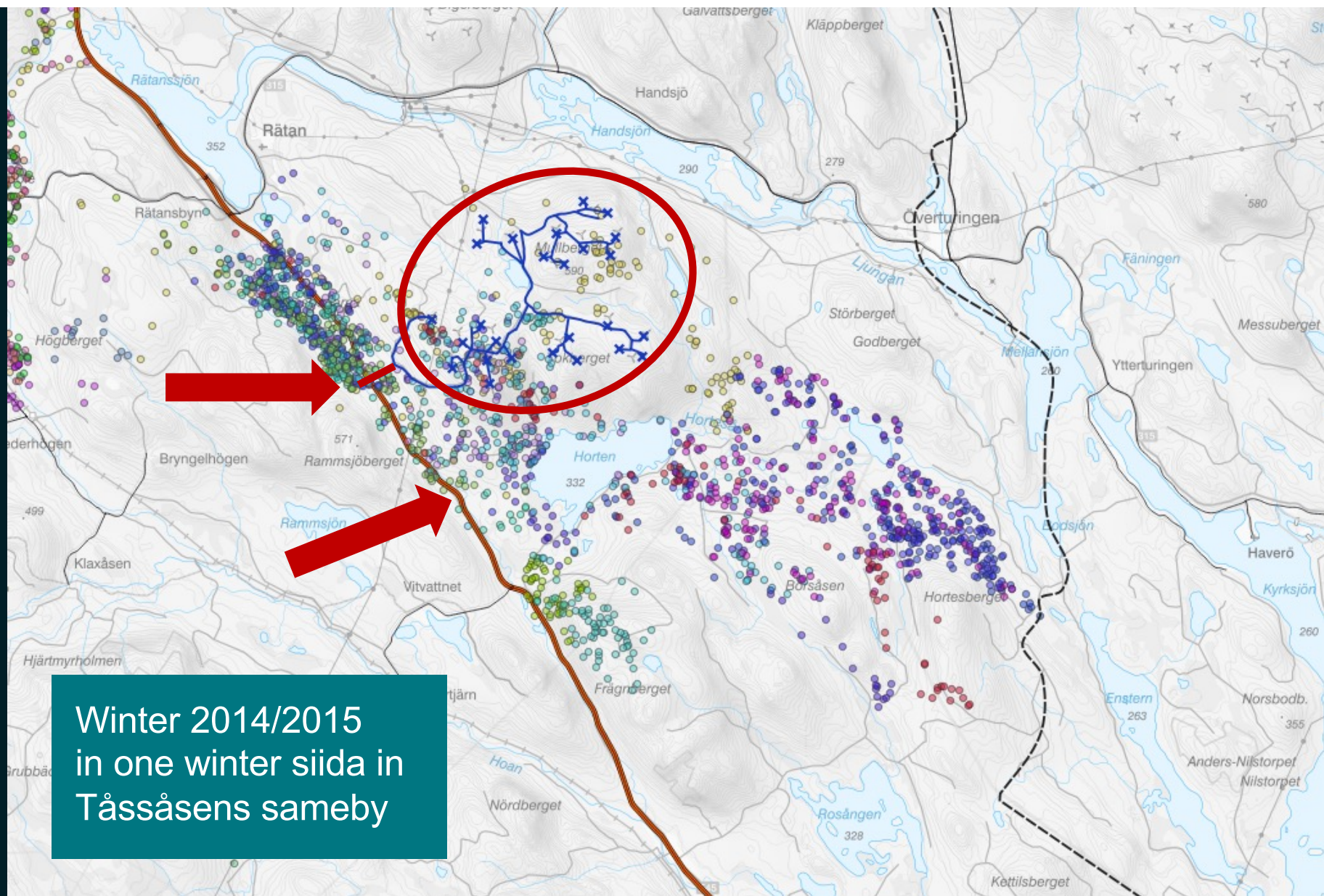
- Use area close to development
- Increased movement rate with sound level
- Avoidance of mines, roads, power lines, houses

Summer

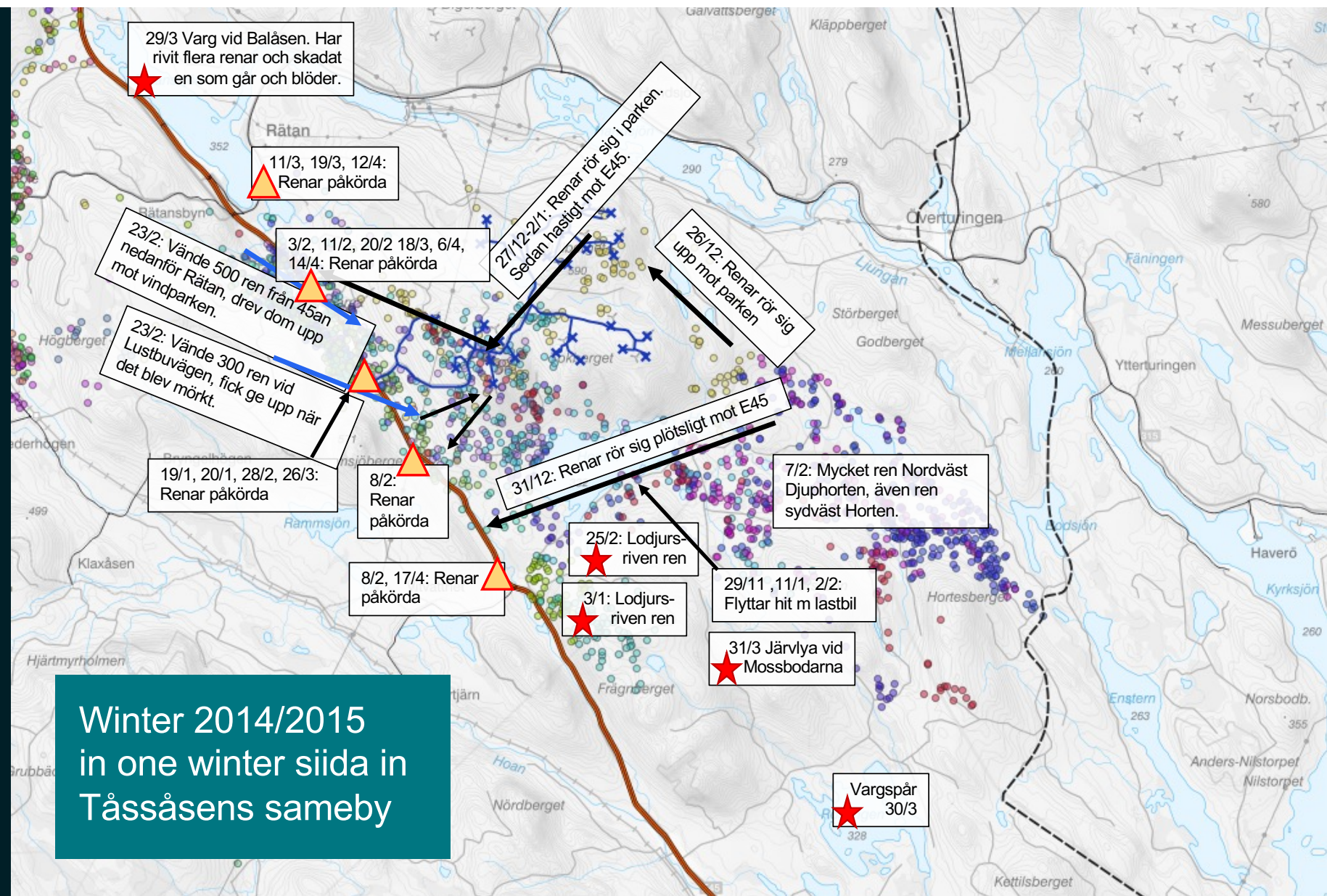
Spring/Calving

Calving period

- Avoidance of mires, clear cuts and forests effects up to 5km
- Increased movement rate close to wind power
- Avoidance of mines, roads, power lines



Winter 2014/2015
in one winter siida in
Tåssåsens sameby



Reinfeed

- feeding reindeer for future free-range functionality

Are animals fed early in life able to cope with the natural conditions?

Do supplementary fed animals get trapped in a “feeding pitfall”?

Heidi Rautiainen PhD-project, SLU

Photo: CJ Utsi

Reinfeed-project and NKJ-network

- Experiment – how is the natural behaviour affected
https://youtu.be/_bajr9kyFJ8
- Interviews with reindeer herders on behavioural effects
- Workshop Arvidsjaur 8-9 juni - discussion on behavioural and environmental effects

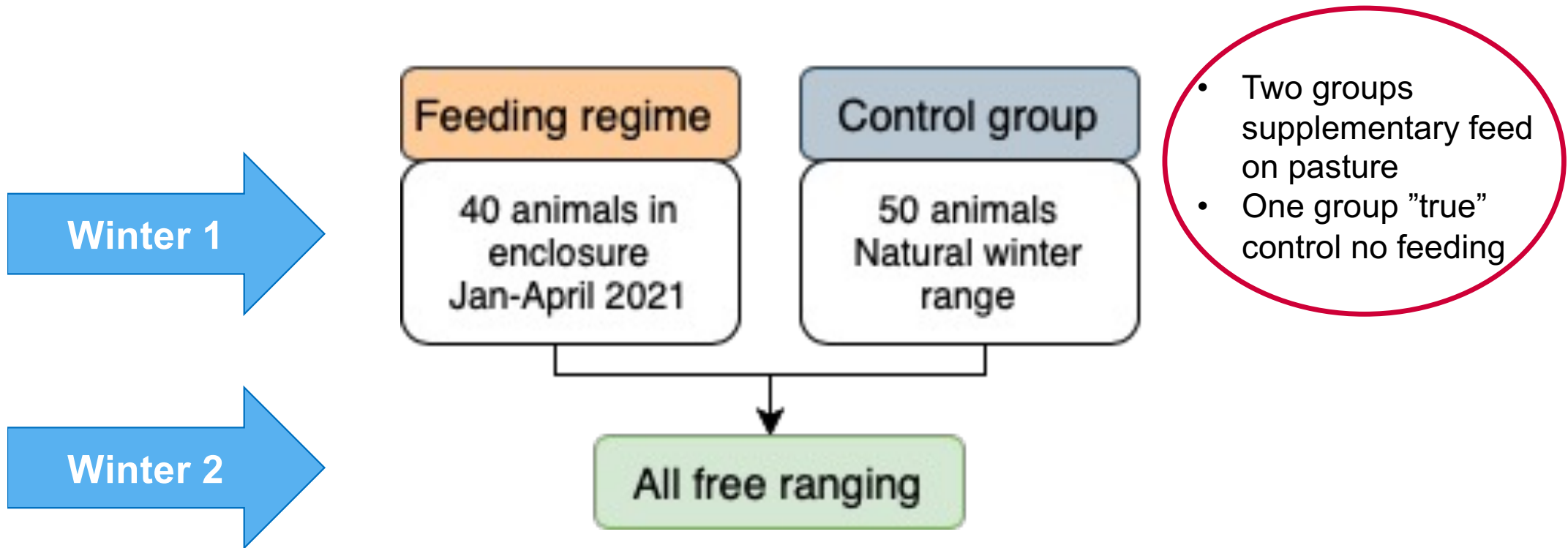


Increased feeding of reindeer

Effect on reindeer behaviour?
Effect on the pastures?



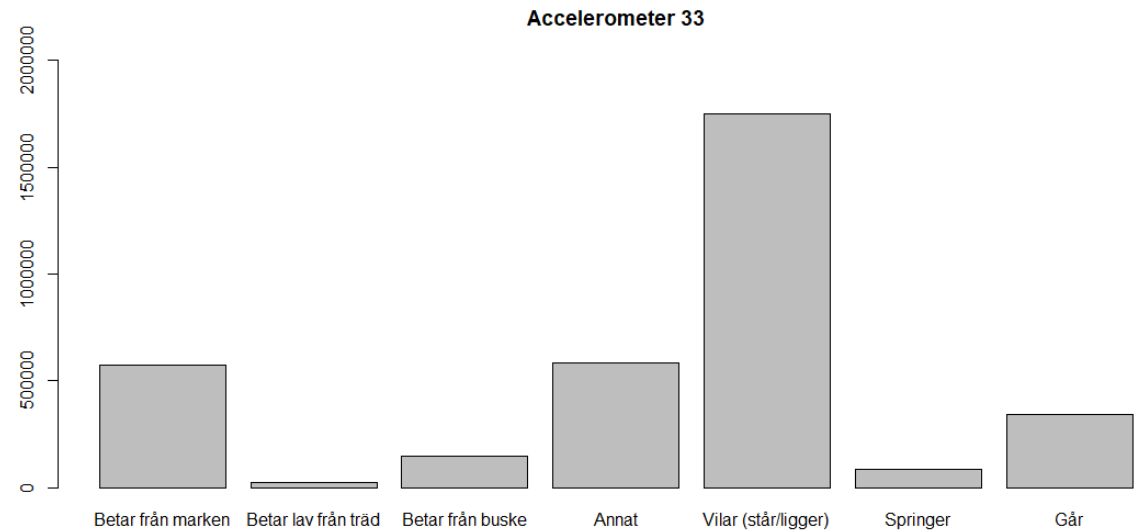
Sirges and Ståkke reindeer herding communities



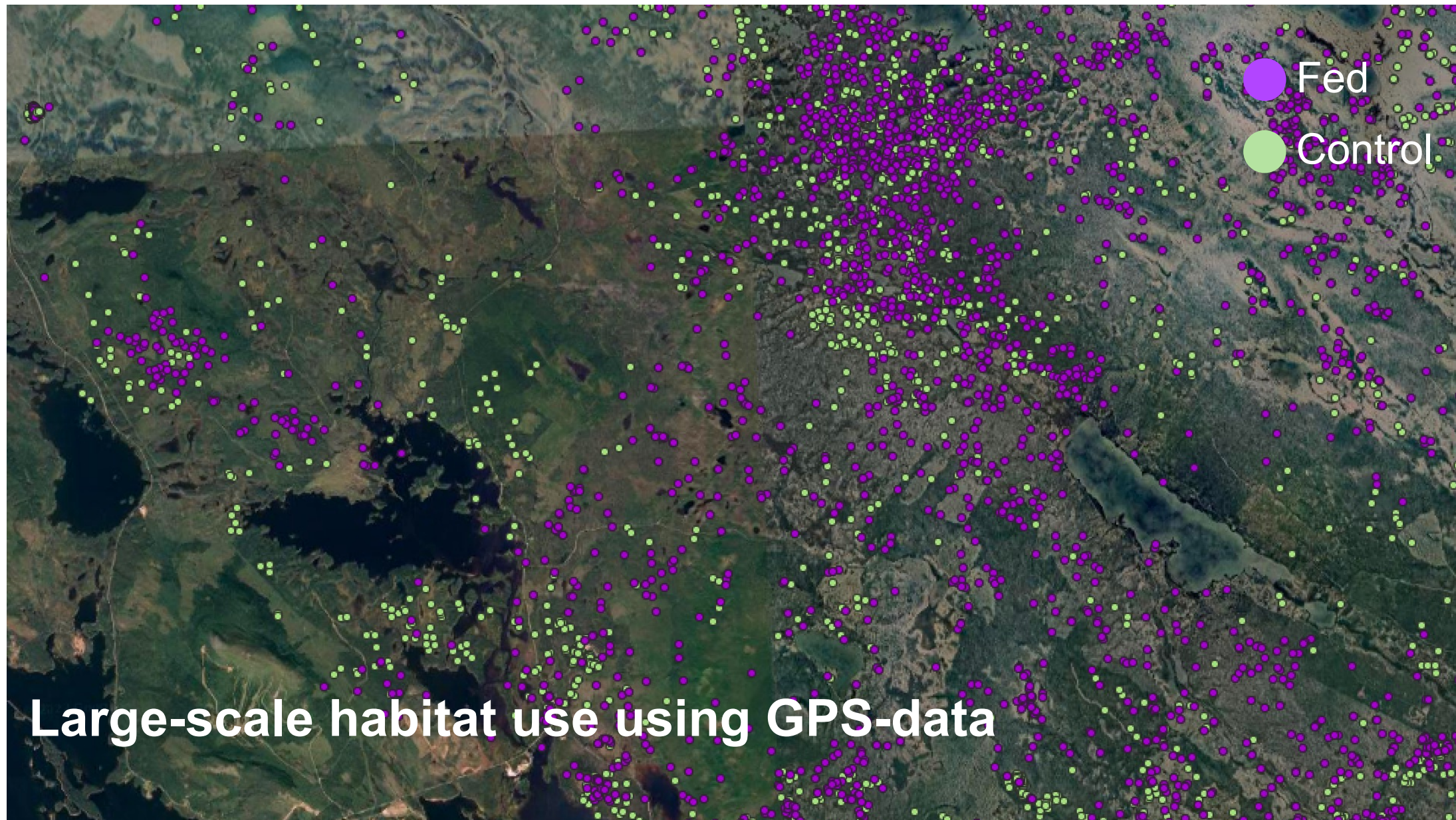
Classification of fine-scale behaviour



Individual 2, Study area 2, Day 1
Behaviour: Browsing "High"

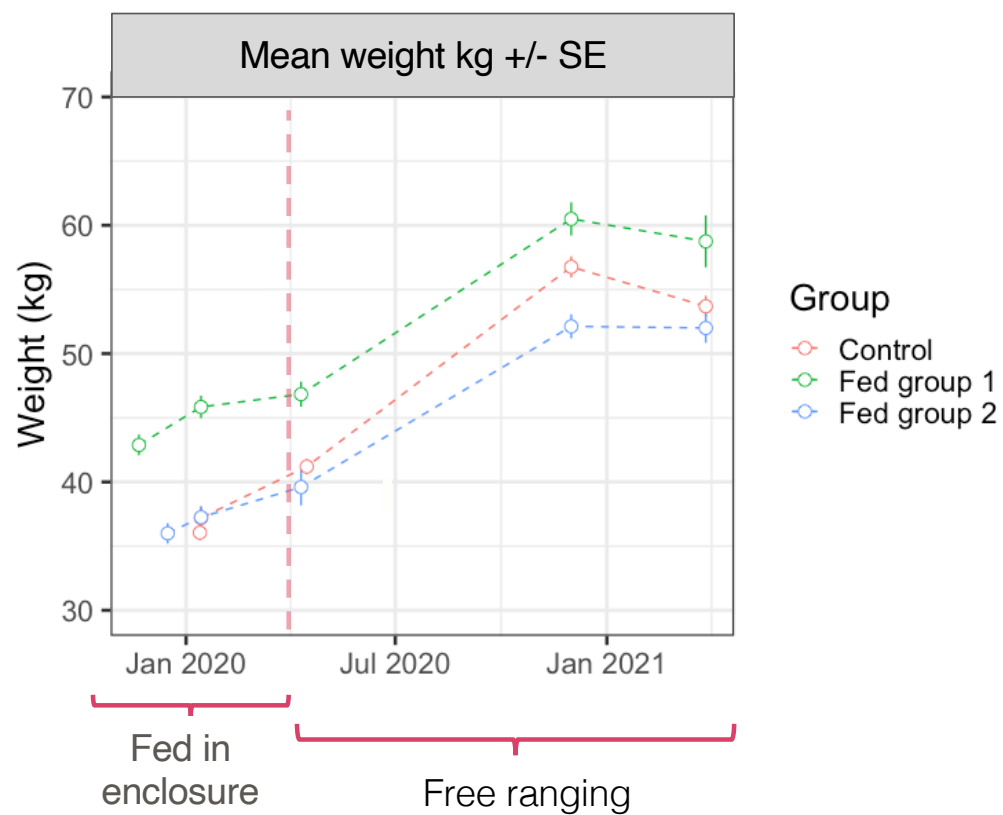


**Andel beteenden för en icke-utfodrad ren
mellan jan-mars 2021 :**

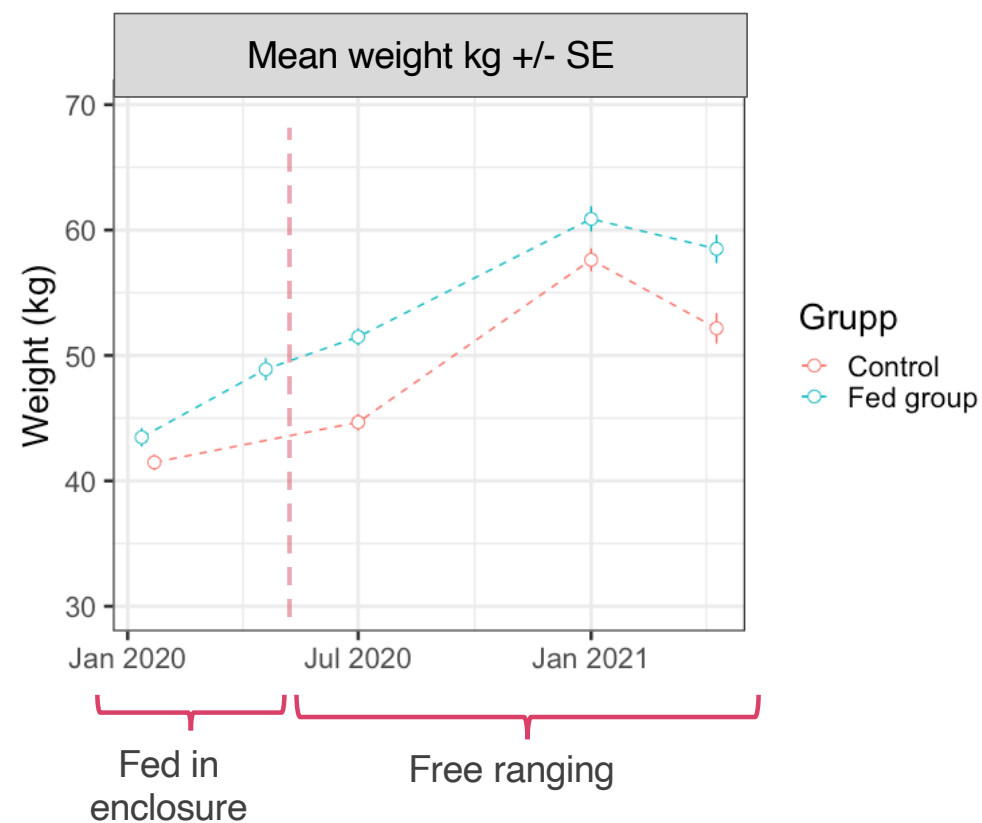


Reindeer condition

Sirges



Ståkke

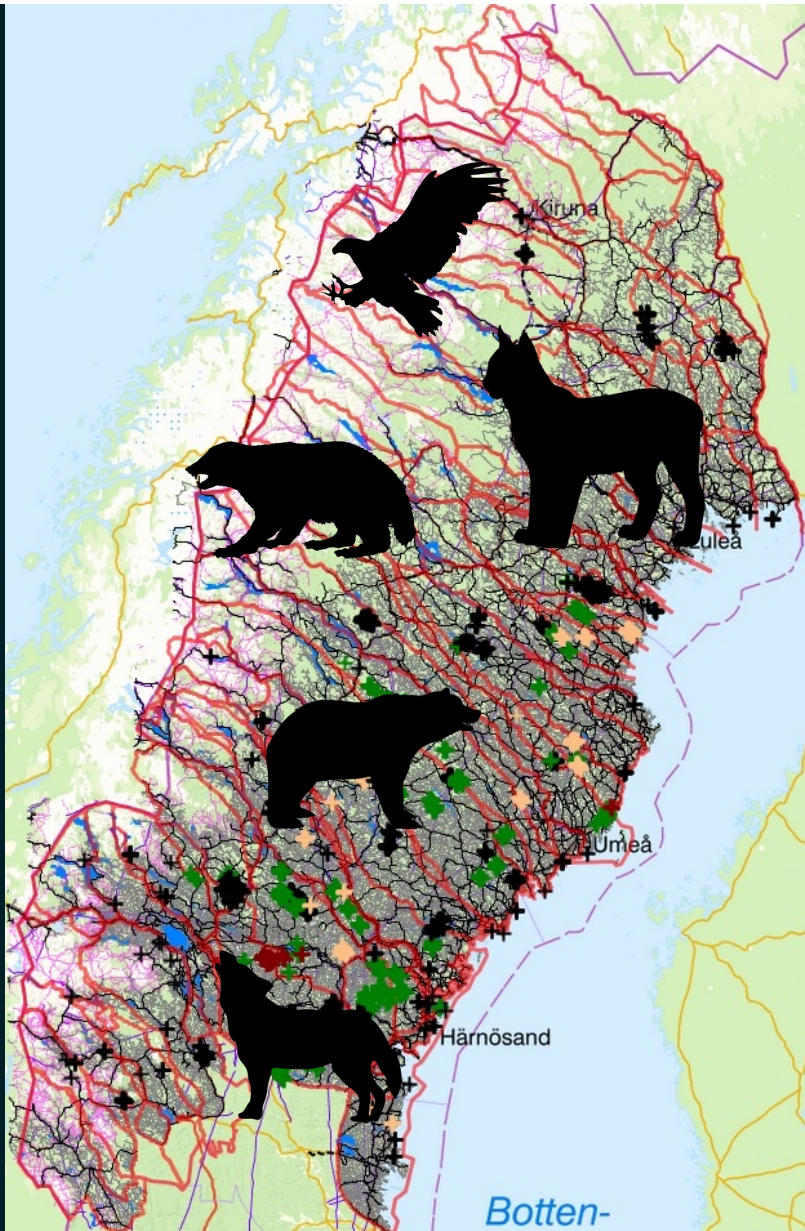




Pasture is the resource

“Har vi inget bete kommer vi aldrig att klara oss.”





Roads

Rail roads

Power lines

Hiking trails

Hydro power

Mining

Wind power

Forestry

Predators

Reinforce

– understand consequence of other land use and climate change on reindeer production

- Ruvhten Sijte - individual marking and live weights (1989–ongoing)
- Slaughter records from Sami Parliament (1996–ongoing)
- Pairwise comparison between herding communities with similar grazing condition but different pressure from land use

Léonie Duris PhD-Project, SLU



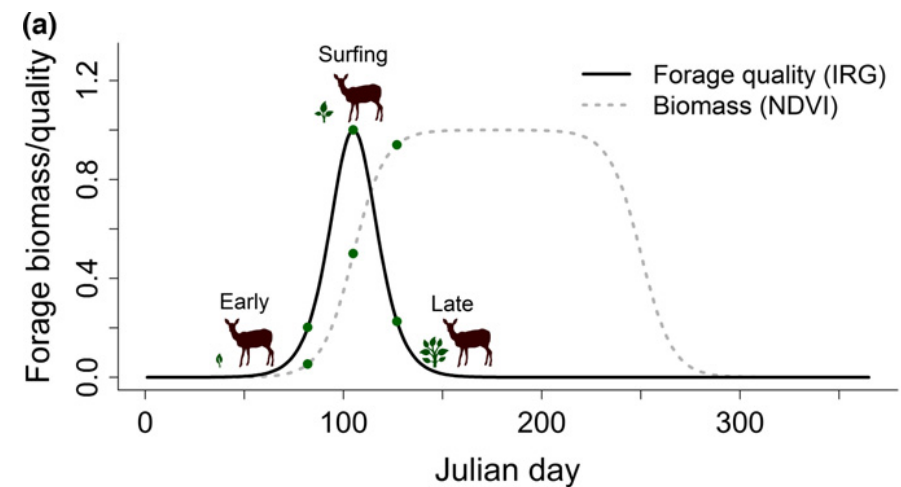
Relate live weight and slaughter records to:

- Weather conditions in summer and winter
- Pasture quality (lichen cover and productivity in pasture - NDVI)
- Predation pressure
- Supplementary feeding
- Cumulative impact from other land use



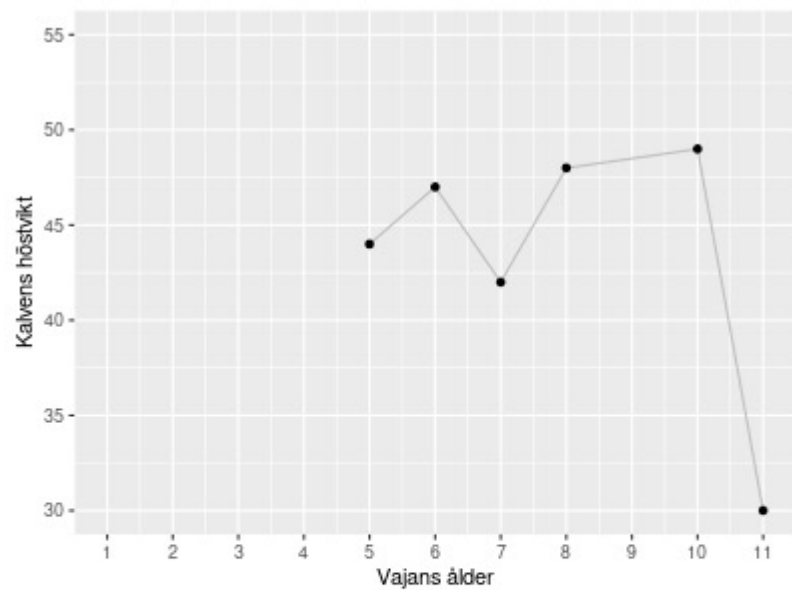
Pasture quality changes in summer

- Timing for start of growing season (early or late)
 - Exempelvis spring 2020 & 2021
- Length of growing season (shorter or longer)
- Dryer

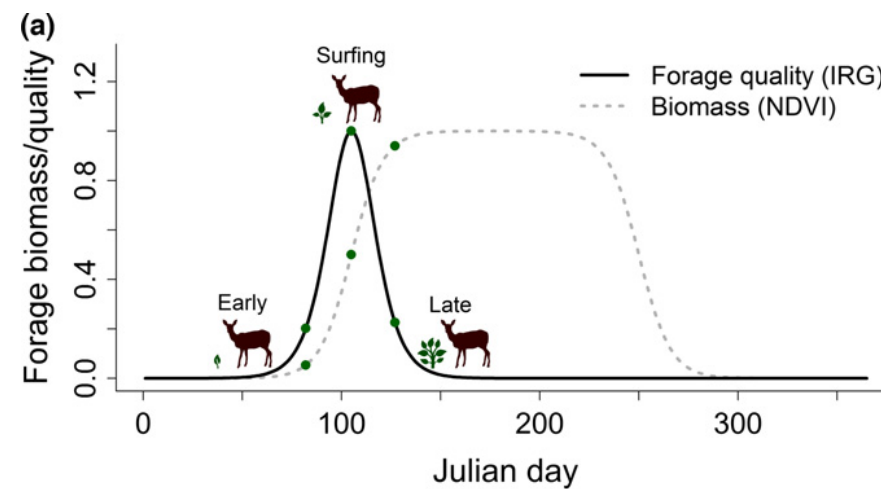


IRG – Instantaneous Rate of Greenup
NDVI – Normalised Difference Vegetation Index

Aikens et al. 2017 Ecology Letters



År	Ålder	Kalv-Id	Höstsvikt	Kön	Slakt/Liv	Sommarvikt
86	5	G350	44	Hon	Liv	NA
87	6	H351	47	Han	Liv	NA
88	7	J226	42	Hon	Liv	21
89	8	K497	48	Han	Slakt	27
91	10	M047	49	Han	Slakt	24
92	11	N030	30	Hon	Slakt	19



IRG – Instantaneous Rate of Greenup
NDVI – Normalised Difference Vegetation Index

Aikens et al. 2017 Ecology Letters

Thanks for listening!
anna.skarin@slu.se



Foto: Carl-Johan Utsi