Reindeer herding, forestry and land use

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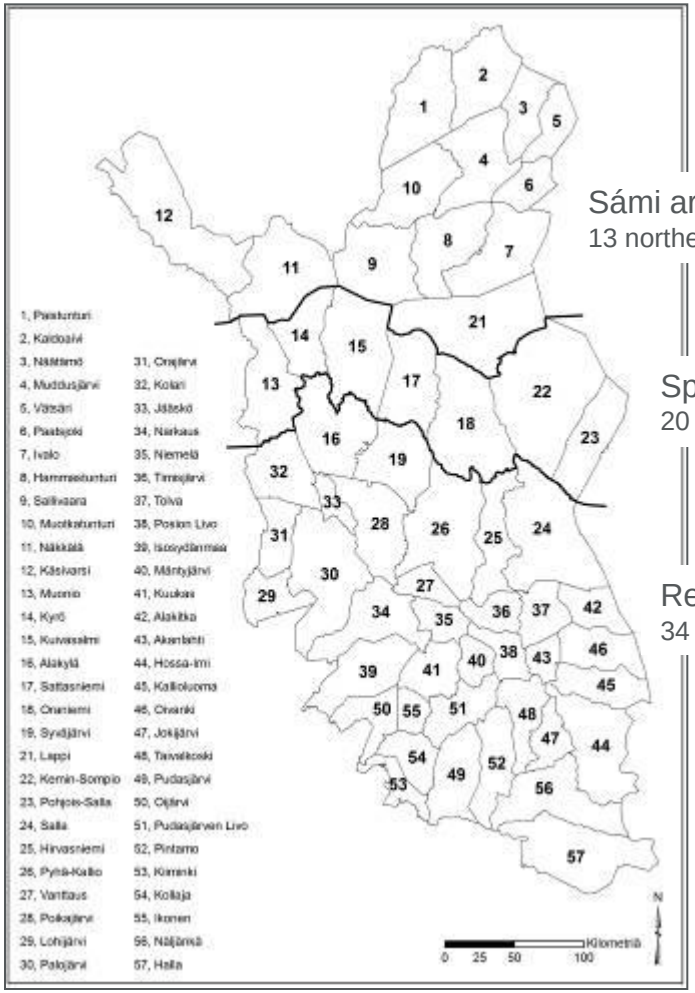
Reindeer husbandry area in Finland



Sámi area
13 northernmost co-operatives

Special area
20 northernmost co-operatives

Rest of the area
34 co-operatives

Land area 114 010 km2, which forms 38% of the land total area in Finland:

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Former research: Importance of ground lichen pastures for reindeer herding

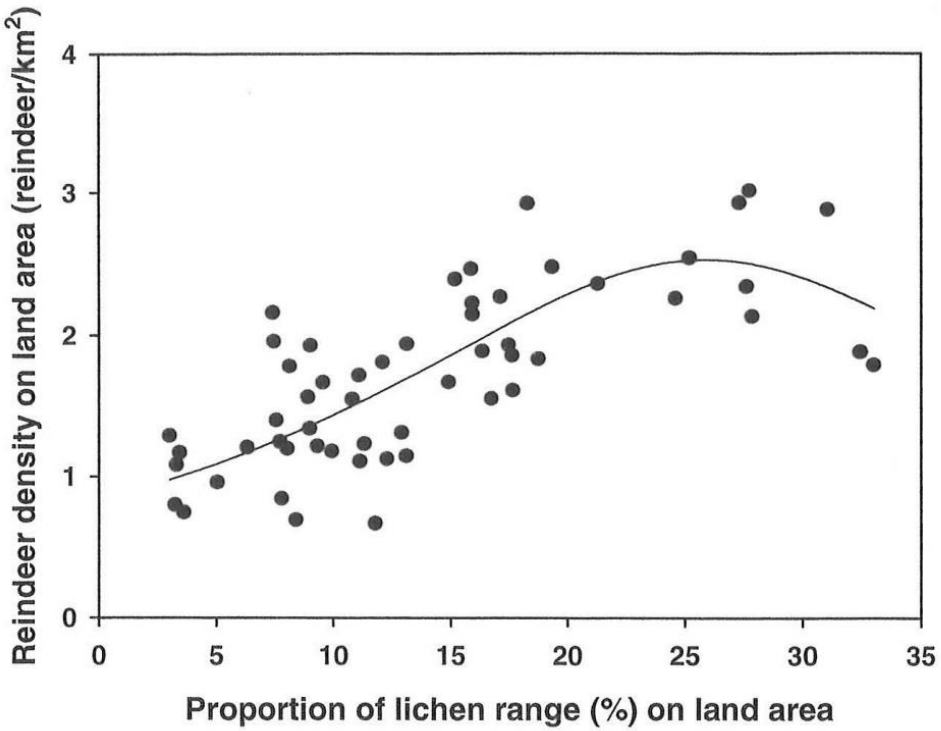

FIG. 2. The dependence of the mean density of semidomesticated reindeer in Finland (measured on total land area in winter, 1974–95) on the proportion (%) of lichen ranges on the land area ($R^2 = 0.59$, N = 55, $y = 2.54/(1+((x-25.82)/18.10)^2)$, $p < 0.0001$).

Source: Kumpula ym. 2000: Arctic 53

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Former research: Importance of ground and arboreal lichen pastures

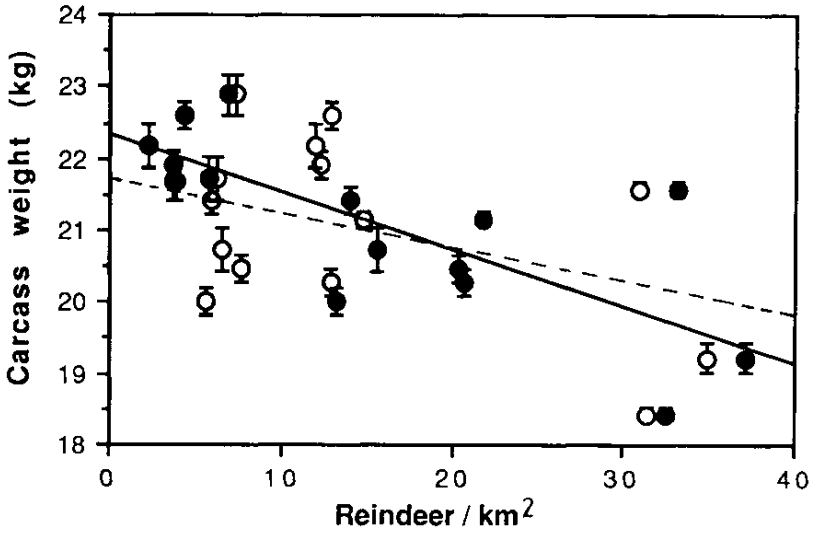
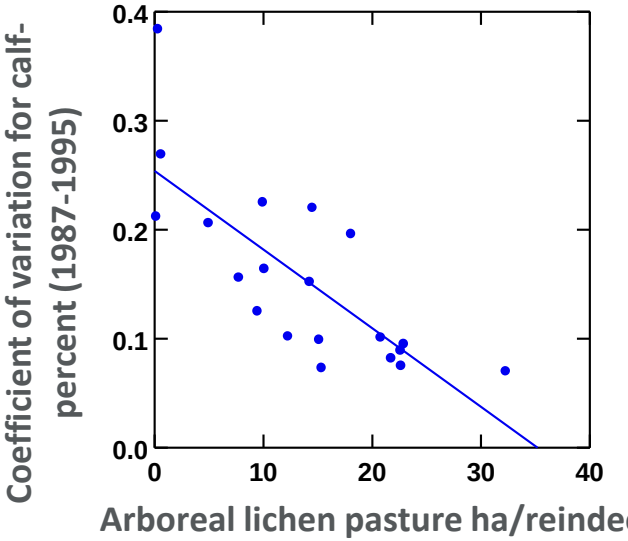


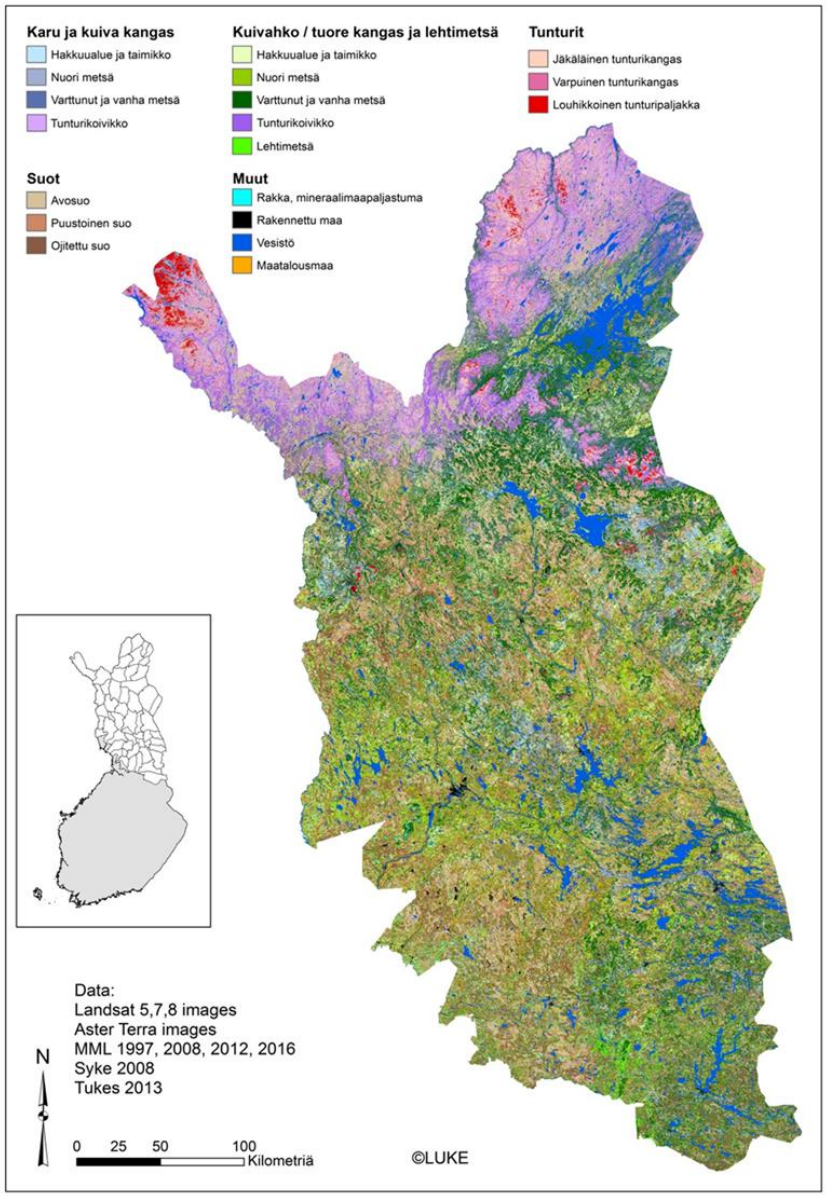
Fig. 4. Dependence of carcass weights of calves on reindeer density in arboreal lichen pastures (black circles, solid line: $r^2=0.56$, $P=0.001$, $N=15$, $y=-0.08x+22.32$) and in lichen pastures (open circles, fragmentary line: $r^2=0.26$, $P=0.05$, $N=15$, $y=-0.06x+21.92$) in Oranie-



Dependence on the variance of calf-% on the amount of availabe arboreal lichen pastures per reindeer in the nothern part of the reindeer herding area during 1987-1995

Source:
Kumpula & Nieminen 1992: Rangifer 12(2)
Kumpula ym. 1998: Canadian Journal of Zoology 76

Present vegetation and the most important winter pastures



Mountain district co-operatives:

•Ground lichen pastures 41% and arboreal lichen pastures11%

Forest-Lapland co-operatives:

•Ground lichen pastures 27% and arboreal lichen pastures 39%

Middle and southern parts co-operatives:

•Ground lichen pastures 7% ja and arboreal lichen pastures 20%.

Source: Luke's research report 33/2019

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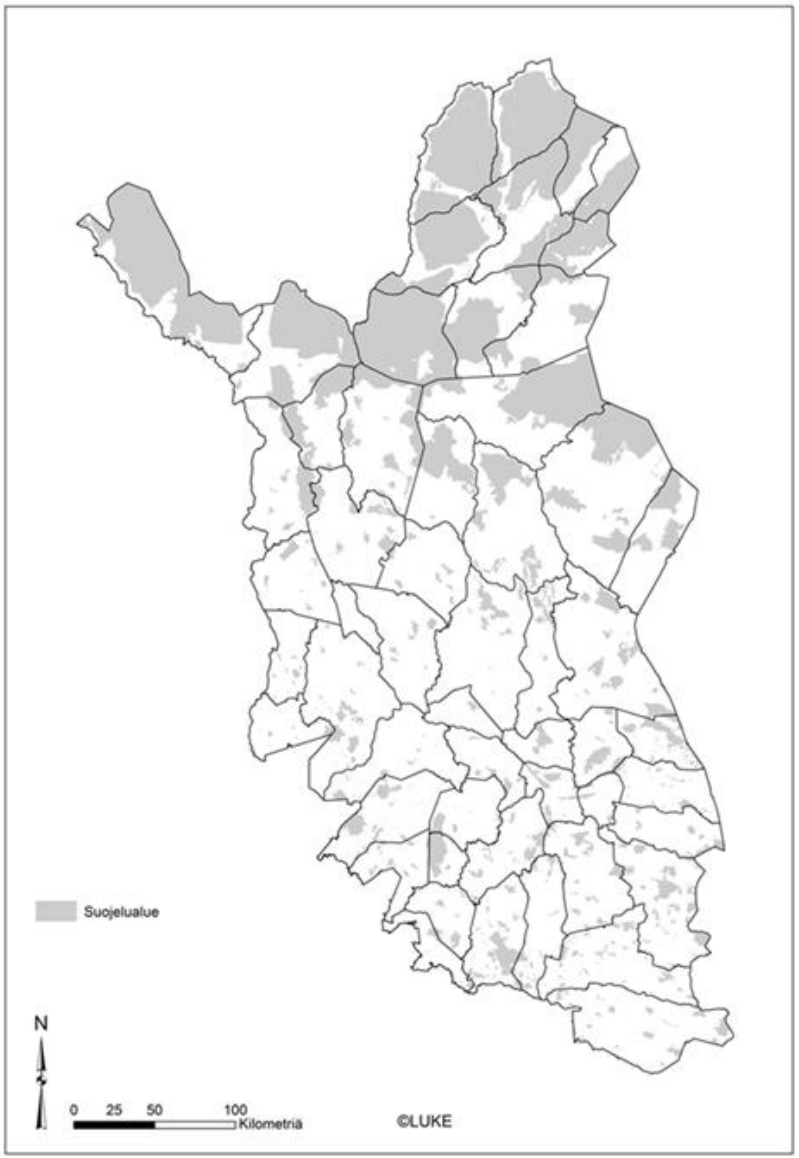
Division of total land area and location of the conservation areas



Division of total land area:

Sate owned land 64%, of which

- 28% in the concervation areas
- 36% in other state land

Private owned land 36%

Source: Luke's research report 33/2019

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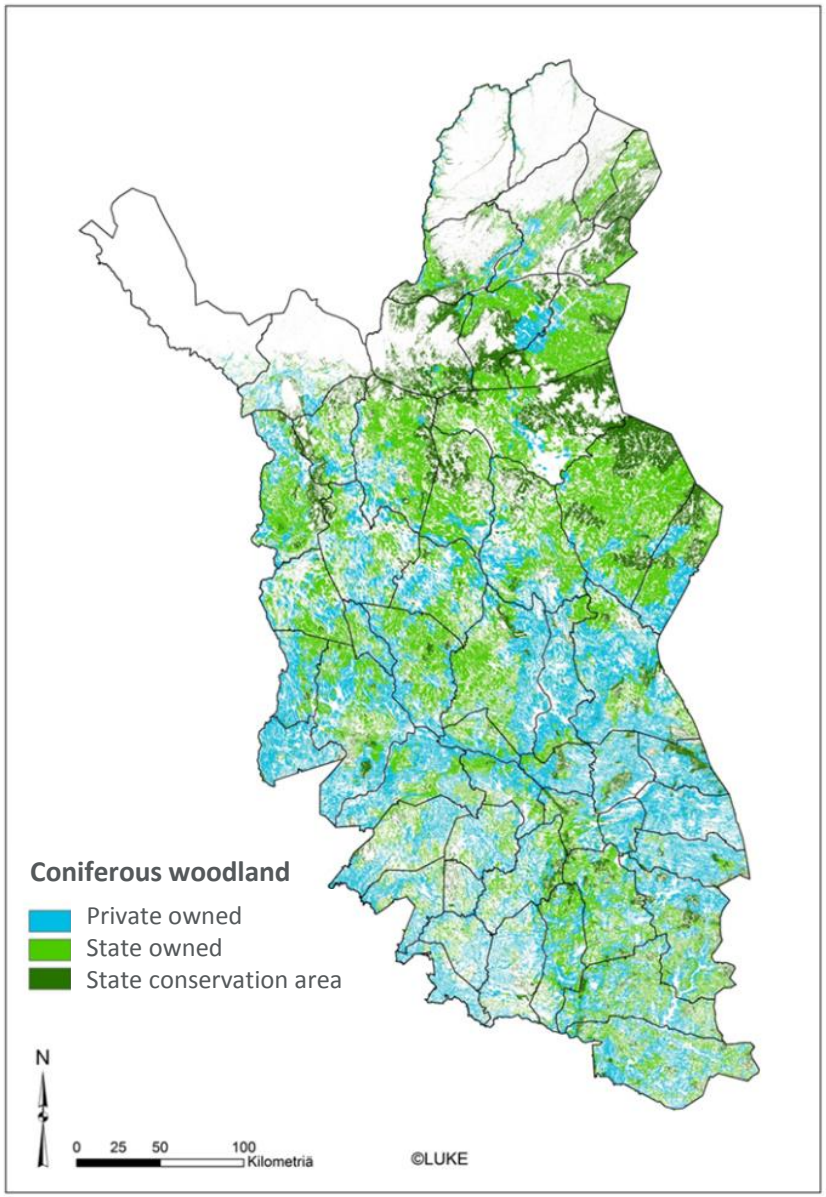
Coniferous forest woodland areas



Coniferous forests woodland covers 48% of the total land area in the reindeer herding area.

Division of this woodland area:

State owned 61 %, of which

- 17% in conservation areas
- 44% outside concervation areas

Private owned 39 %

Source: Luke's research report 33/2019

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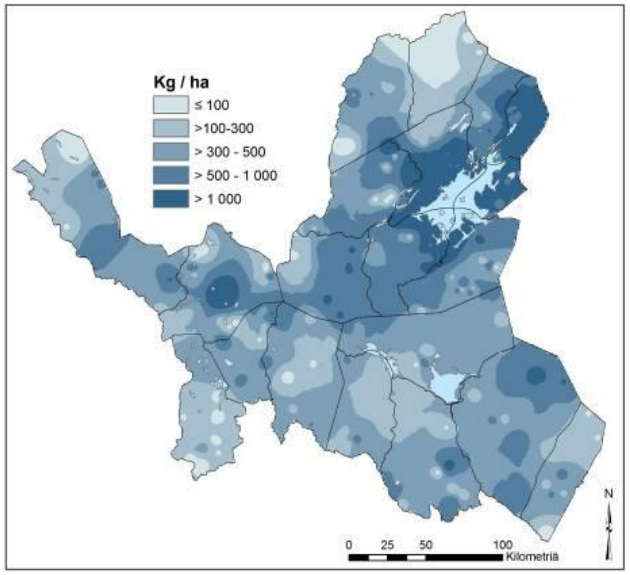
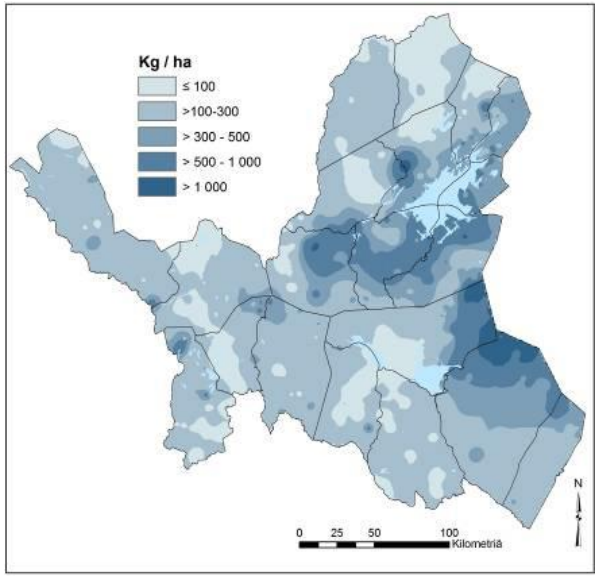
Reindeer pasture inventory: Changes in the ground liches biomass on lichen pastures in the nothern part of area.

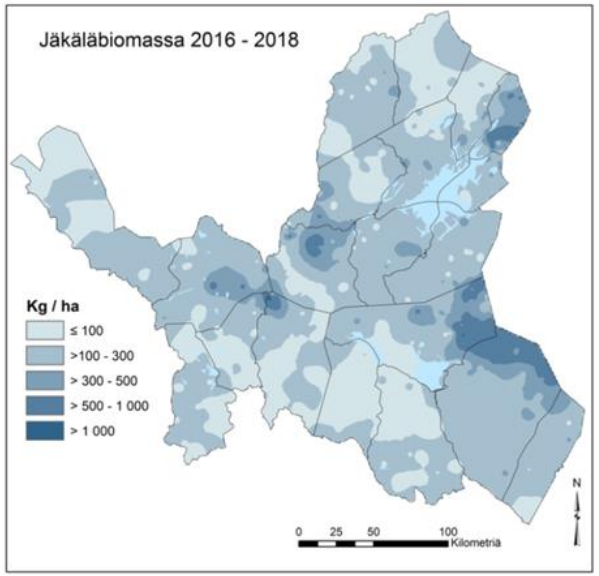
Pasture inventory 1995-1996



Pasture inventory 2005-2008



Pasture inventory 2016-2018



Source: Luke's research report 33/2019

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Effects of reindeer: **Reindeer grazing and trampling reduce ground lichens and change structure of mountain birch forests.**

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Impacts of forestry on reindeer pastures

Reduction of old growth forests

Changes in ground vegetation structure

Changes in light and moisture conditions

Site preparation and ploughing

Forest harvesting residue

Large scaled changes in forest structure and vegetation

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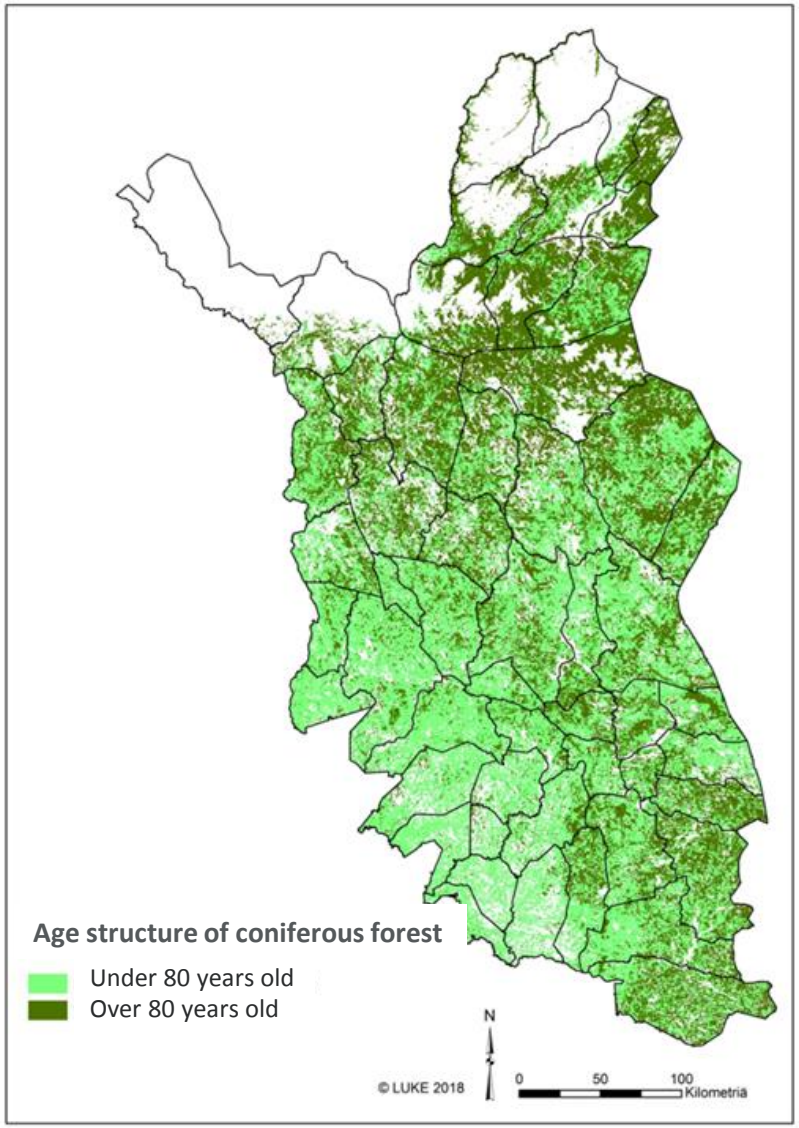
Pasture inventory: Present age structure of coniferous forests due to forestry



- Mature and old forests 46% (over 80 years old)

- Felled and sapling stand areas, young cultivated forests 54%

Source: Luke's research report 33/2019

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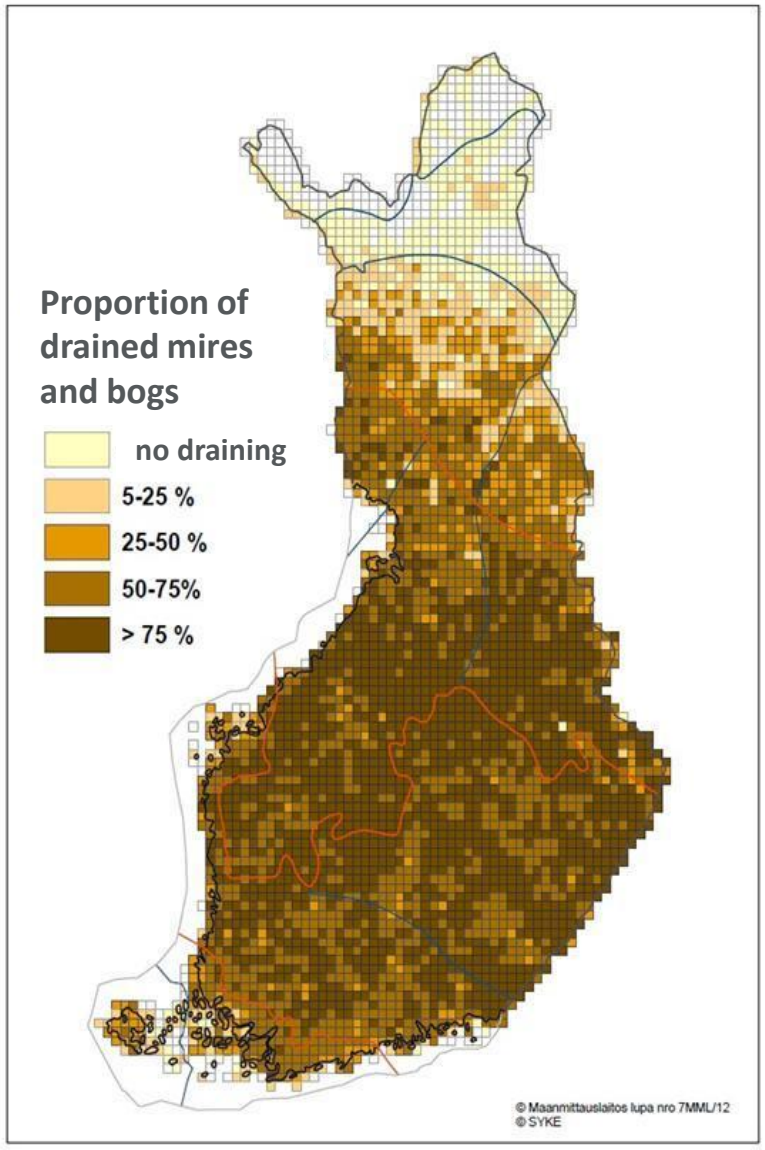
Besides large scaled changes in the coniferous forest structure, reindeer pasture quality has been deteriorated by massive draining of mires and bogs



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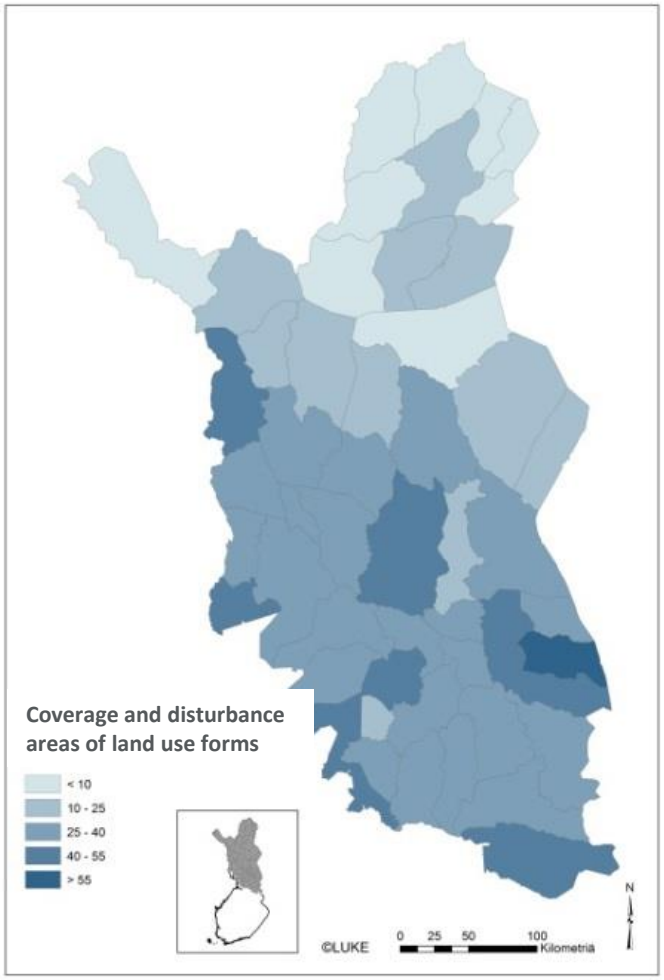
Pasture inventory: Different land use forms in reindeer husbandry area

25% of the land area is covered and disturbed by different land use and infrastructure forms (variety 3-62 % between co-operatives)



Source: Luke's research report 33/2019

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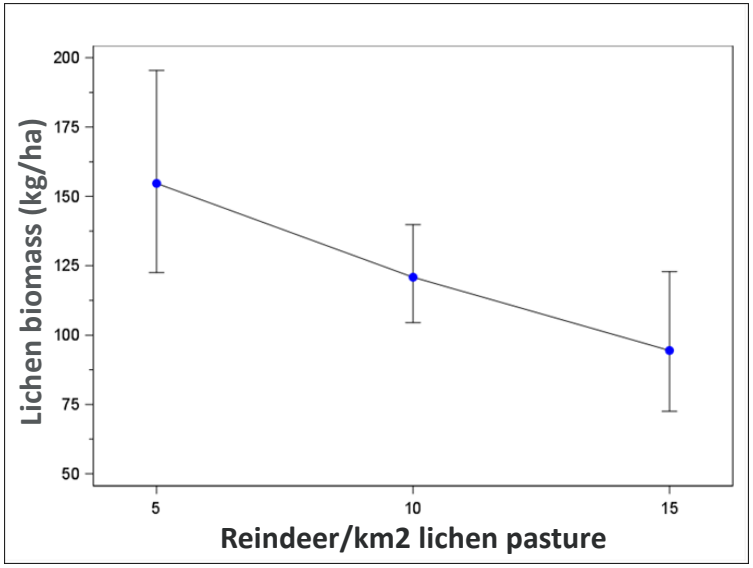
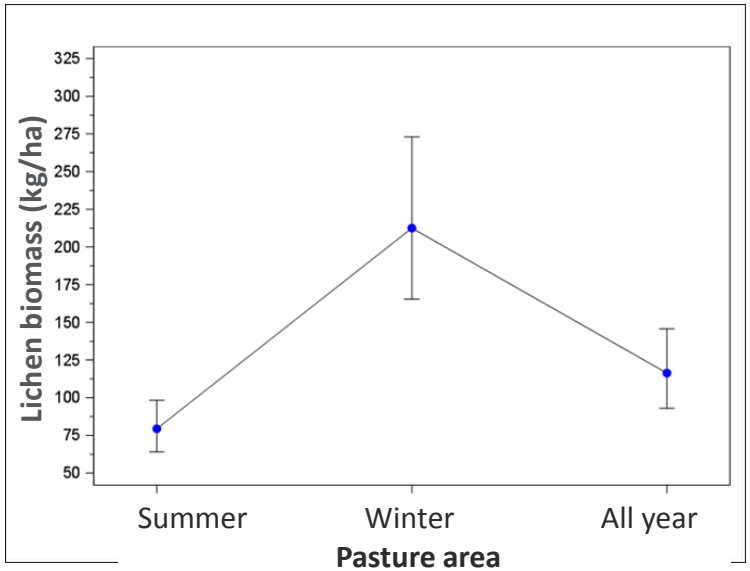
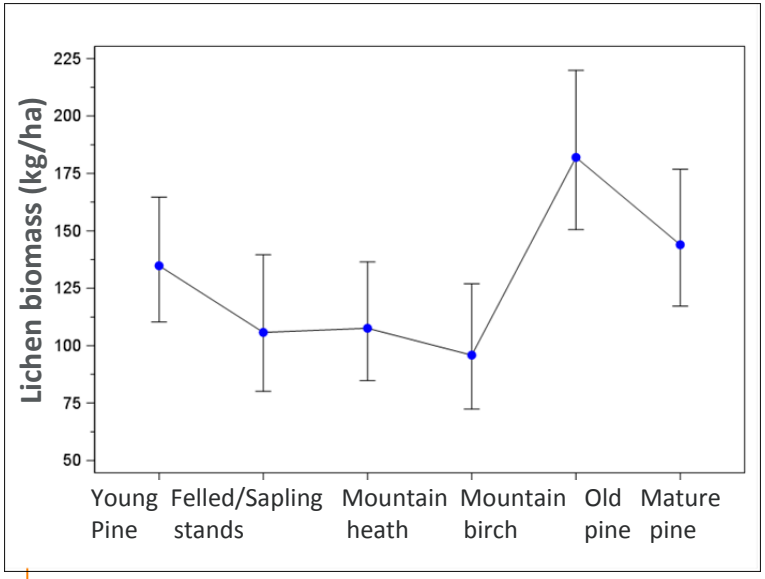
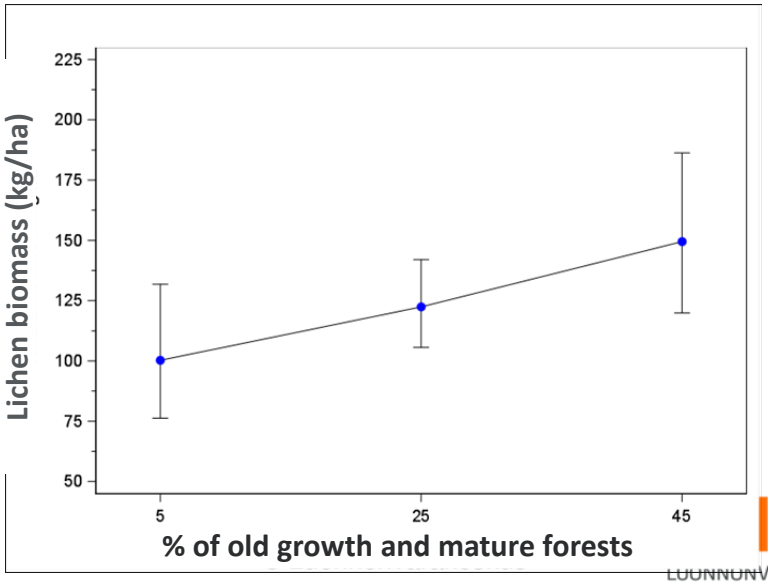
Pasture inventory: Effects of different factors on the ground lichen biomass in the 20 nothermost reindeer herding co-operatives



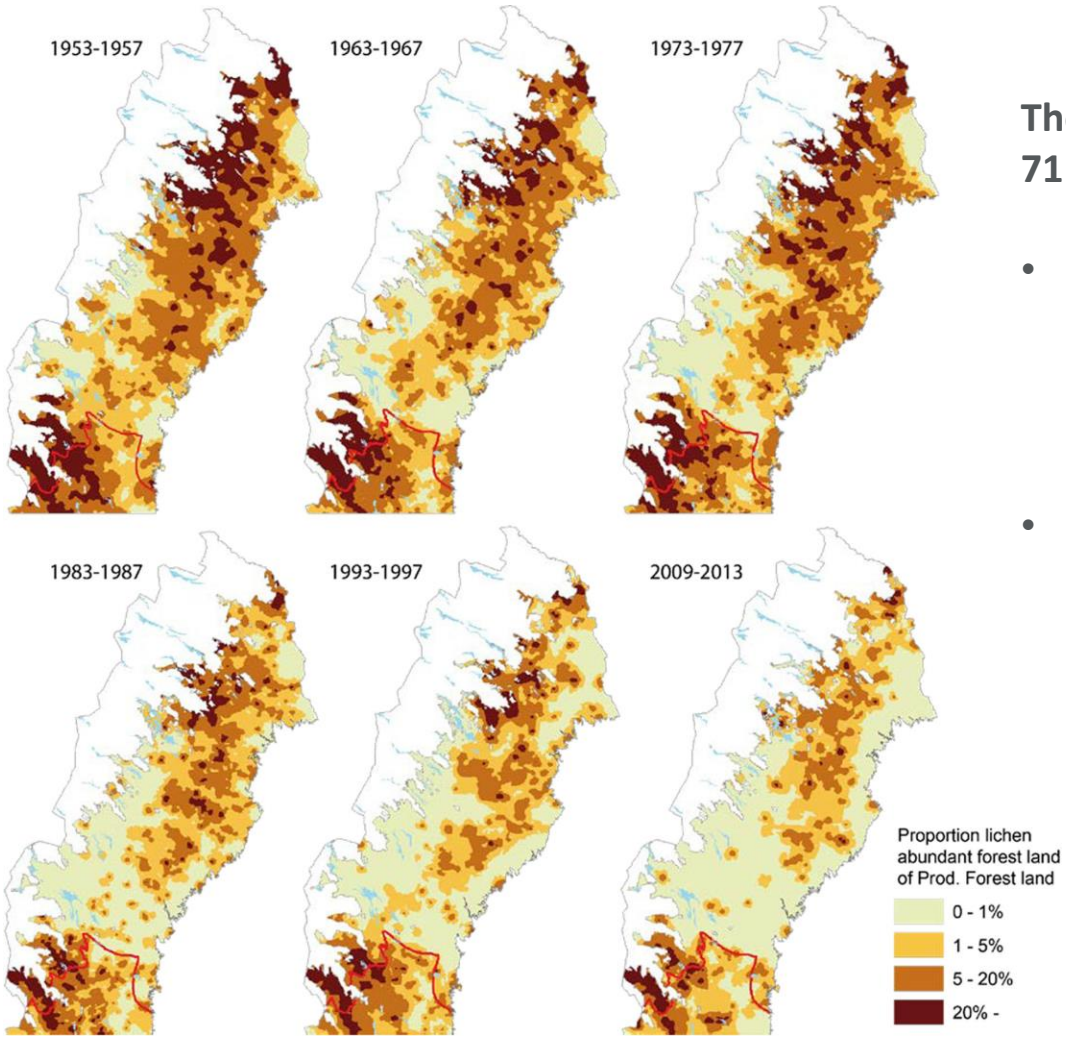






Source: Luke's research report 33/2019

The decline of ground lichen forests in the Swedish boreal landscape



The decline of lichen rich pine forests has been 71 % in the reindeer herding area of Sweden

- This reduction is explained best by the change in the age structure of pine forests and the substituotion of old pine forests by young cultivated forests .
- Reindeer densities do not explain this decline in the statistical analysis.

Sandström et al. 2016 Ambio: *On the decline of ground lichen forests in the Swedish boreal landscape: Implications for reindeer husbandry and sustainable forest management (DOI 10.1007/s13280-015-0759-0)*

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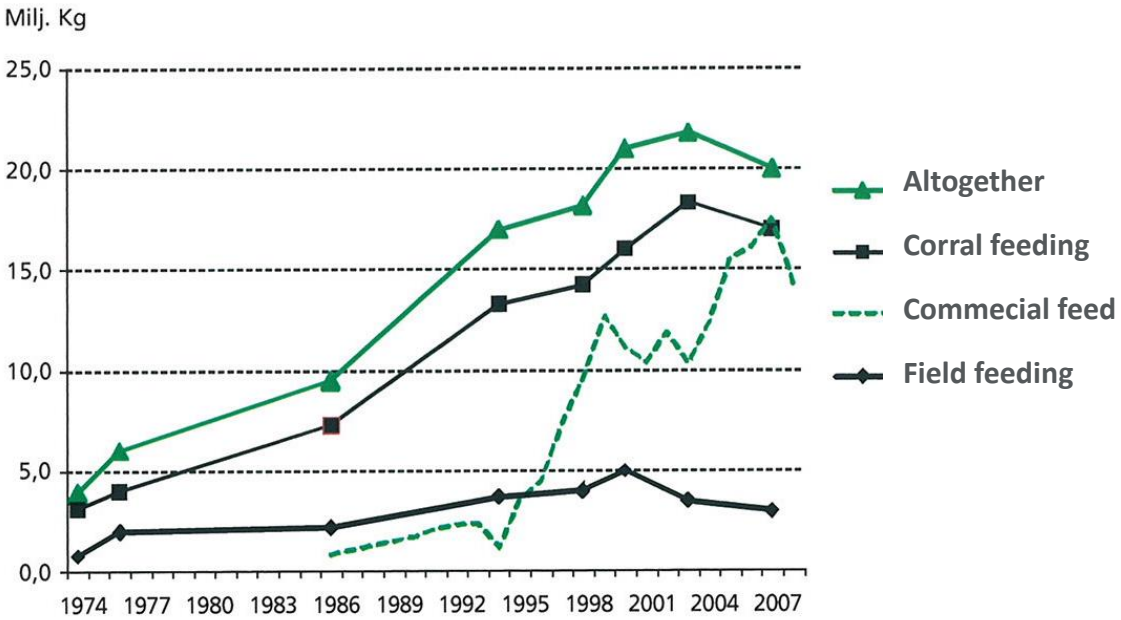
Trends on the amount of supplementary feed used by the reindeer herding in Finland



Kuva 5. Poron ruokinnan kehitys ja sen jakaantuminen tarha- ja maastoruokintaan (milj. kg, kuivaksi heinäksi laskettuna) sekä kaupallisten rehujen määrä.

Saarni & Nieminen 2011 (Riista- ja kalatalous, Tutkimuksia ja selvityksiä 10/2011)

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Conclusions and suggestions

- Reindeer herding system, forestry, land use, conservation, weather and climate all affect the state of reindeer pastures and the sustainability of reindeer husbandry.
- Reindeer husbandry in Finland has adapted to the degradation of winter pastures by intensifying management methods and increasing supplementary feeding of reindeer.
- Feeding has stabilized and raised meat production, but increased management costs and also changed the reindeer herding system and reindeer itself .
- Pasture resources still affect, however, markedly the productivity and profitability of reindeer herding.
- More comprehensive and sustainable management plans, measures and politics for reindeer husbandry and the general use of pasture environments are needed.
- Suggested measures:

- developing pasture rotation systems
- preserving the most important old growth forest pasture areas
- increasing widely the continuous-cover silviculture methods
- saving the most important pasture areas from new land use schemes

Thank you!

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