



# Produksjon og tap i reindriften i Nordland

Torkild Tveraa  
Henrik Brøseth  
Knut Langeland  
Audun Stien  
Jenny Stien  
Mari Tovmo



# Forprosjektets mål

---

- Hvilke trender er det over tid i reintall, slakteuttak, slaktevekker og klimatiske forhold?
- I hvilken grad kan variasjon i reintall, slakteuttak og slaktevekker forklares av variasjon i ressurstilgang og rovvilt?
- Hvilke data mangler og bør innhentes for å belyse de spørsmålene som avdekkes gjennom analysene av offentlige tilgjengelige data?

# Bakgrunn

- Tap drives av flere forhold
  - ▶ Rovvilt
  - ▶ Klima(endringer)
  - ▶ Ressurssituasjonen
  - ▶ Konkurransen om beiteiland
  - ▶ + +



Journal of Animal Ecology 2014

**SPECIAL FEATURE: STUCK IN MOTION? RECONNECTING QUESTIONS AND TOOLS IN MOVEMENT ECOLOGY**

**'You shall not pass!': quantifying barrier permeability and proximity avoidance by animals**

Hawthorne L. Beyer<sup>1\*</sup>, Eliezer Gurarie<sup>2,3</sup>, Luca Börger<sup>4</sup>, Manuela Panzacchi<sup>5</sup>, Mathieu Basille<sup>6</sup>, Ivar Herfindal<sup>7</sup>, Bram Van Moorter<sup>5</sup>, Subhash R. Lele<sup>8</sup> and Jason Matthiopoulos<sup>9</sup>

Journal of Animal Ecology 2011

doi: 10.1111/j.1365-2656.2011.01913.x

**Density-dependence vs. density-independence – linking reproductive allocation to population abundance and vegetation greenness**

Bård-Jørgen Bårdsen<sup>1</sup> and Torkild Tveraa<sup>2</sup>

Journal of Applied Ecology 2014, 51, 1264-1272

doi: 10.1111/1365-2656.12322

**The role of predation and food limitation on claims for compensation, reindeer demography and population dynamics**

Torkild Tveraa<sup>1\*</sup>, Audun Stien<sup>1</sup>, Henrik Brøseth<sup>2</sup> and Nigel G. Yoccoz<sup>3,4</sup>

*Ecological Applications*, 22(5), 2012, pp. 1640–1654  
© 2012 by the Ecological Society of America

**Native predators reduce harvest of reindeer by Sámi pastoralists**

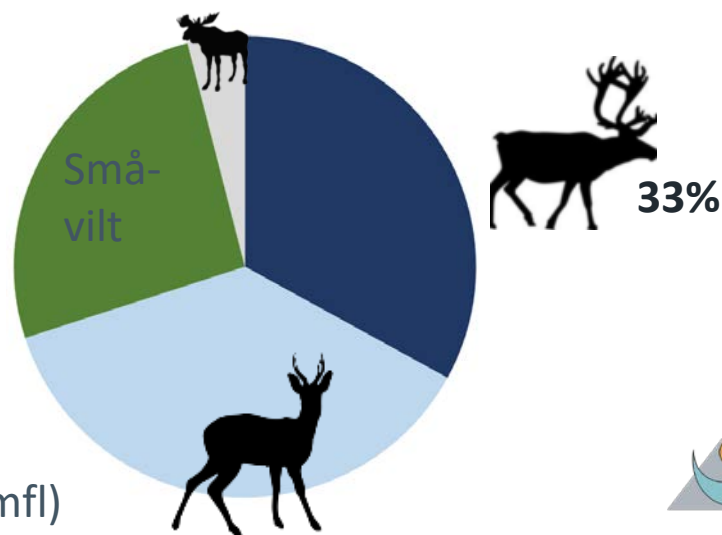
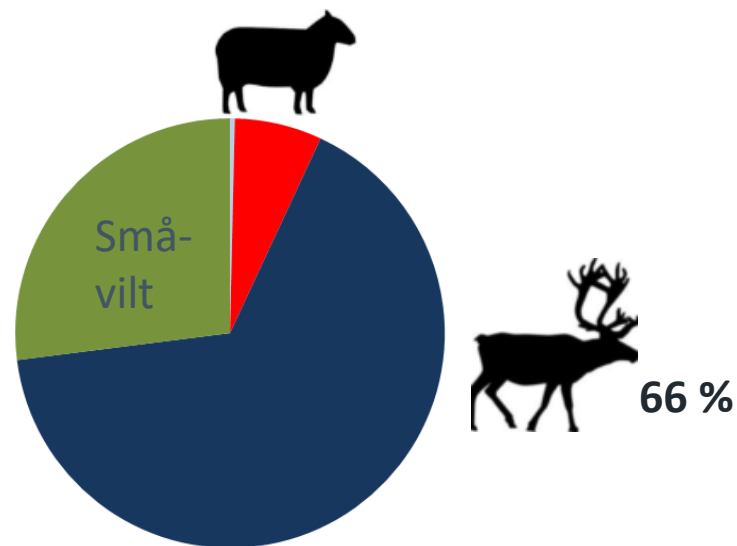
N. THOMPSON HOBBS,<sup>1,3</sup> HENRIK ANDRÉN,<sup>2</sup> JENS PERSSON,<sup>2</sup> MALIN ARONSSON,<sup>2</sup> AND GUILLAUME CHAPRON<sup>2</sup>

**HUMAN IMPACTS**

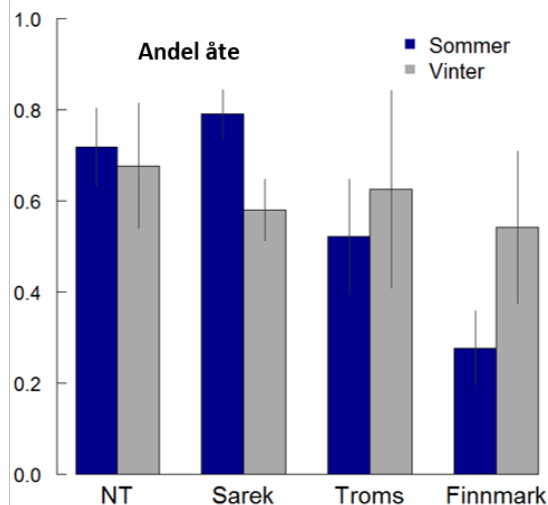
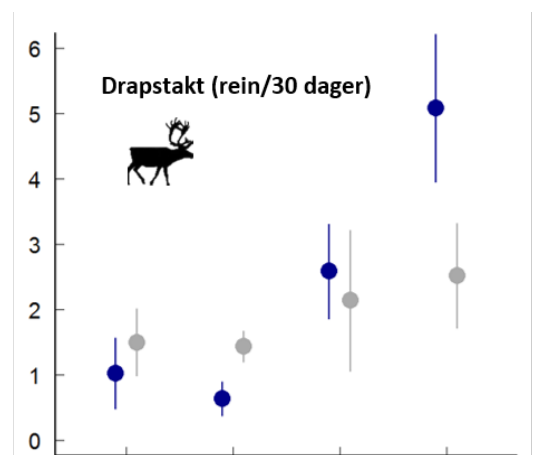
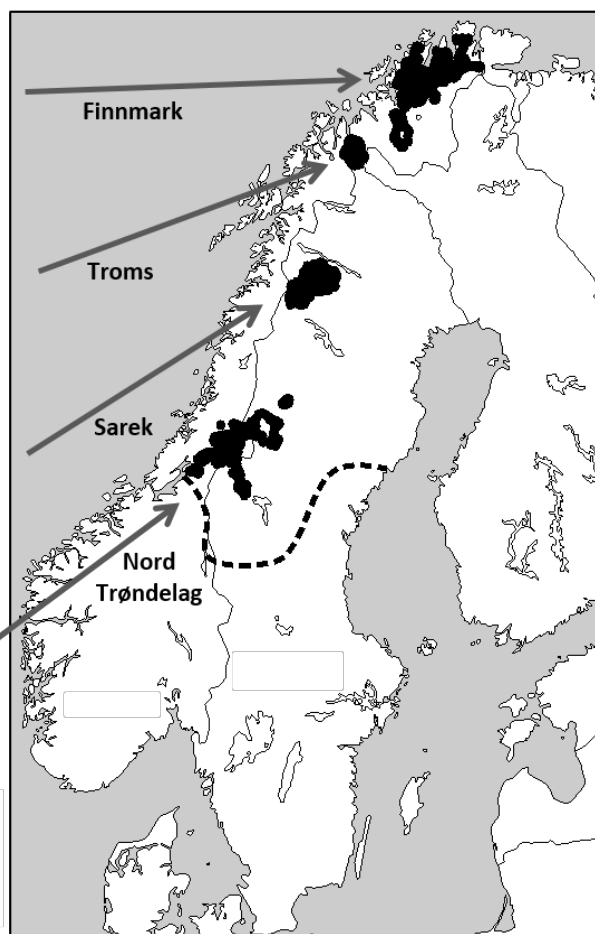
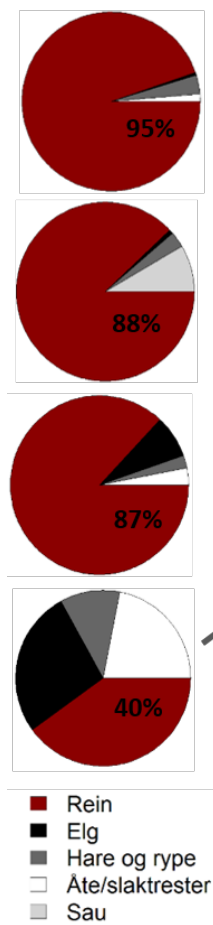
**Moving in the Anthropocene: Global reductions in terrestrial mammalian movements**

Marlee A. Tucker,<sup>1,2\*</sup> Katrin Böhning-Gaese,<sup>1,3</sup> William F. Fagan,<sup>5,4</sup> John M. Fryxell,<sup>5</sup> Bram Van Moorter,<sup>6</sup> Susan C. Alberts,<sup>7</sup> Abdillahi H. Ali,<sup>8</sup> Andrew M. Allen,<sup>9,10</sup> Nima Arfaki,<sup>11</sup> Tal Avgar,<sup>12</sup> Hattie Bartlam-Brooks,<sup>13</sup> Brantvaatar Bayarbaatar,<sup>14</sup> Jerrold L. Belant,<sup>15</sup> Alessandra Bertazzoni,<sup>16</sup> Dean Beyer,<sup>17</sup> Laura Blömer,<sup>18</sup> Floris M. van Beest,<sup>19</sup> Stephen Blake,<sup>20,21</sup> Niels Blum,<sup>22</sup> Chloe Bracis,<sup>1,3</sup> Danielle Brown,<sup>23</sup> P. J. Nico de Bruyn,<sup>24</sup> Francesca Cagnacci,<sup>25,26</sup> Justin M. Calabrese,<sup>27</sup> Constança Camillo-Alves,<sup>28,29</sup> Simon Chamaillé-Jammes,<sup>30</sup> André Chiaradia,<sup>31,32</sup> Sarah C. Davidson,<sup>33,34</sup> Todd Dennis,<sup>35</sup> Stephen DeStefano,<sup>36</sup> Duane Dieffenbach,<sup>37</sup> John Douglas Hamilton,<sup>38,39</sup> Julian Fenner,<sup>40</sup> Claudia Fichtel,<sup>41</sup> Wolfgang Fiedler,<sup>42</sup> Christina Fischer,<sup>43</sup> Ilya Fischhoff,<sup>44</sup> Christen H. Fleming,<sup>45</sup> Adam T. Ford,<sup>46</sup> Susanne A. Fritz,<sup>47</sup> Benedikt Gehr,<sup>48</sup> Jacob R. Goheen,<sup>49</sup> Eliezer Gurarie,<sup>50,51</sup> Mark Hebblewhite,<sup>52</sup> Marco Heurich,<sup>50,53</sup> A. J. Mark Hevason,<sup>54</sup> Christian Hof,<sup>55</sup> Edward Hurme,<sup>56</sup> Lynne A. Isbell,<sup>57,58</sup> René Janssen,<sup>59</sup> Florian Jeltsch,<sup>60</sup> Petra Kazensky,<sup>61,62</sup> Adam Kane,<sup>63</sup> Peter M. Kappeler,<sup>64</sup> Matthew Kaufman,<sup>65</sup> Roland Kays,<sup>66,67</sup> Duncan Kinney,<sup>68</sup> Hanka Koch,<sup>69,70</sup> Bert Kratanzburger,<sup>71</sup> Scott LaVigne,<sup>72,73</sup> Peter Leimgruber,<sup>74</sup> John D. C. Linnell,<sup>75</sup> Faouel López-López,<sup>76</sup> A. Catherine Markham,<sup>77</sup> Jenny Mattisson,<sup>78</sup> Emilia Patricia Medici,<sup>79,80</sup> Ugo Mellone,<sup>81</sup> Evelyn Merrill,<sup>82</sup> Guilherme de Miranda Mourão,<sup>83</sup> Ronaldo G. Morato,<sup>84</sup> Nicolas Morvellet,<sup>85</sup> Thomas A. Morrison,<sup>86</sup> Samuel L. Diaz-Muñoz,<sup>87,88</sup> Ate Mysterud,<sup>89</sup> Dejid Namdinsotseg,<sup>90</sup> Ram Nathan,<sup>91</sup> Aifin Niamir,<sup>92</sup> John Odden,<sup>93</sup> Robert B. O'Hara,<sup>1,74</sup> Luiz Gustavo R. Oliveira Santos,<sup>94</sup> Kirk A. Olson,<sup>95</sup> Bruce D. Patterson,<sup>96</sup> Rogério Cunha de Paula,<sup>97</sup> Luca Pedroni,<sup>98</sup> Rikien Riebeling,<sup>99,100</sup> Martin Rimmer,<sup>101</sup> Tracey L. Rogers,<sup>102</sup> Christer Moe Rolandsen,<sup>103</sup> Christopher S. Rosenberry,<sup>104</sup> Daniel I. Rubenstein,<sup>105</sup> Kamran Safi,<sup>106,107</sup> Sonia Said,<sup>108</sup> Nir Sapir,<sup>109</sup> Hall Sawyer,<sup>110</sup> Niels Martin Schmidt,<sup>111,112</sup> Nuria Selva,<sup>113</sup> Agnieszka Sęgiot,<sup>114</sup> Fakhitruslin Shillegamba,<sup>115</sup> João Paulo Silva,<sup>116,117</sup> Navinder Singh,<sup>118</sup> Erling J. Solberg,<sup>119</sup> Orr Spiegel,<sup>120</sup> Olav Strand,<sup>121</sup> Siva Sundaresan,<sup>122</sup> Wiebke Thimmrich,<sup>123</sup> Ulrich Voigt,<sup>124</sup> Jake Wall,<sup>125</sup> David Whittes,<sup>126</sup> Martin Wikelski,<sup>127,128</sup> Christopher C. Willson,<sup>129</sup> John W. Wilson,<sup>130</sup> George Wittemyer,<sup>131,132</sup> Filip Zięba,<sup>133</sup> Tomasz Zwijacz-Kozłowski,<sup>134</sup> Thomas Mueller<sup>135,136</sup>

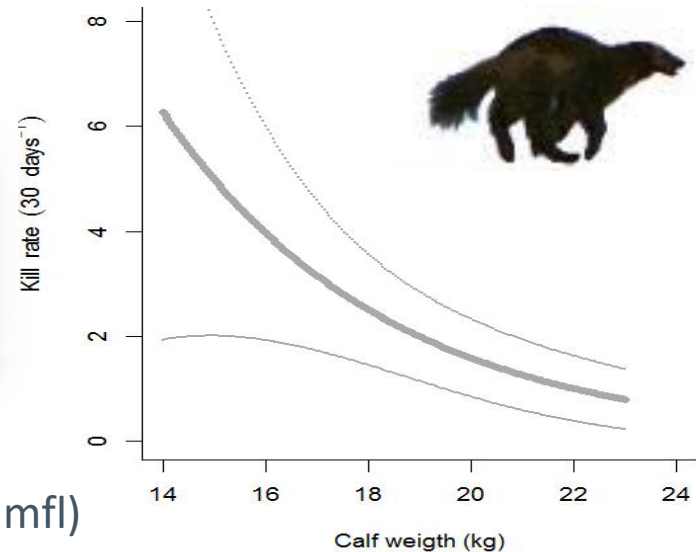
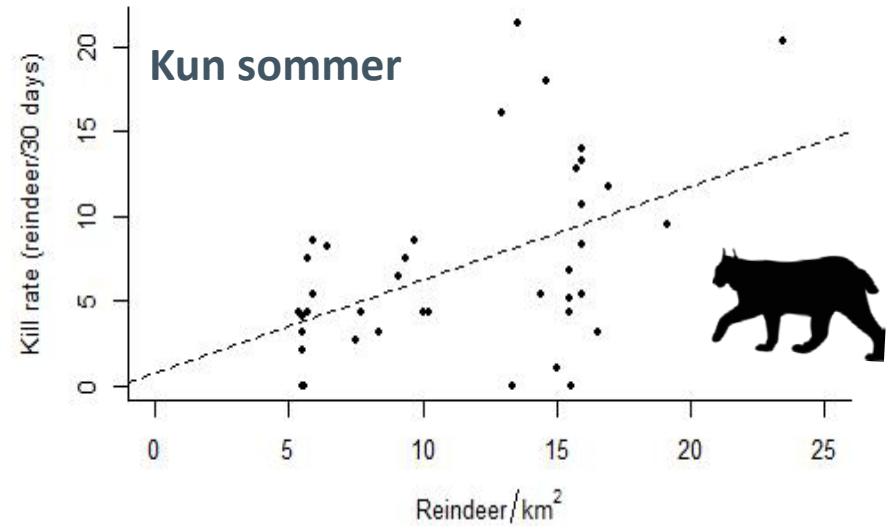
# Gaupas diett



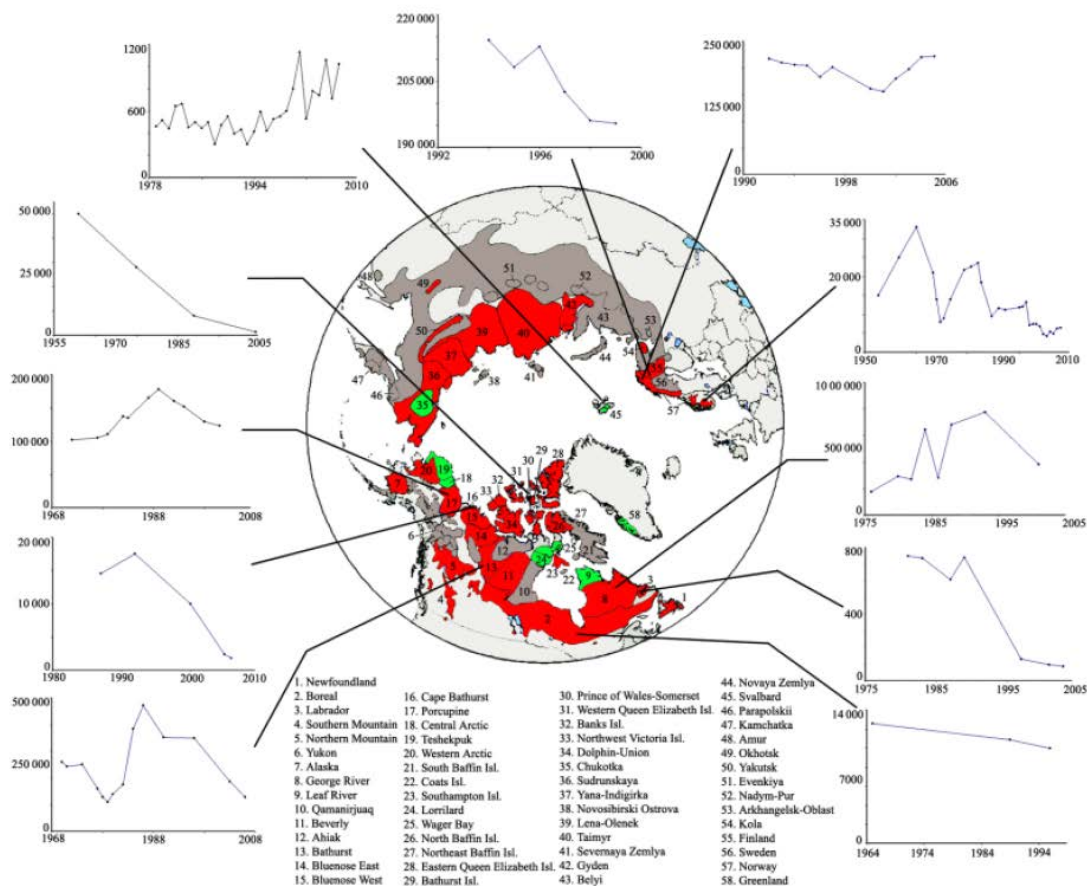
# Jervens diett



# Dreper oftere rein ved høye reintettheter / lave kalvevekter



# Klimaendringer



## Arctic greening from warming promotes declines in caribou populations

Per Fauchald,<sup>1\*</sup> Taejin Park,<sup>2</sup> Hans Tommervik,<sup>1</sup> Ranga Myneni,<sup>2</sup> Vera Helene Hausner<sup>3</sup>

RESEARCH ARTICLE

## Long-Term Trends and Role of Climate in the Population Dynamics of Eurasian Reindeer

Alessia Ubani<sup>1,2\*</sup>, Tim Horstkoetter<sup>2</sup>, Eina Kaarfejärvi<sup>1,2</sup>, Anthony Sévèque<sup>1</sup>, Florian Stammier<sup>1</sup>, Johan Olofsson<sup>1</sup>, Bruce C. Forbes<sup>1</sup>, Jon Moen<sup>1</sup>

# Vekttap kompenseres for

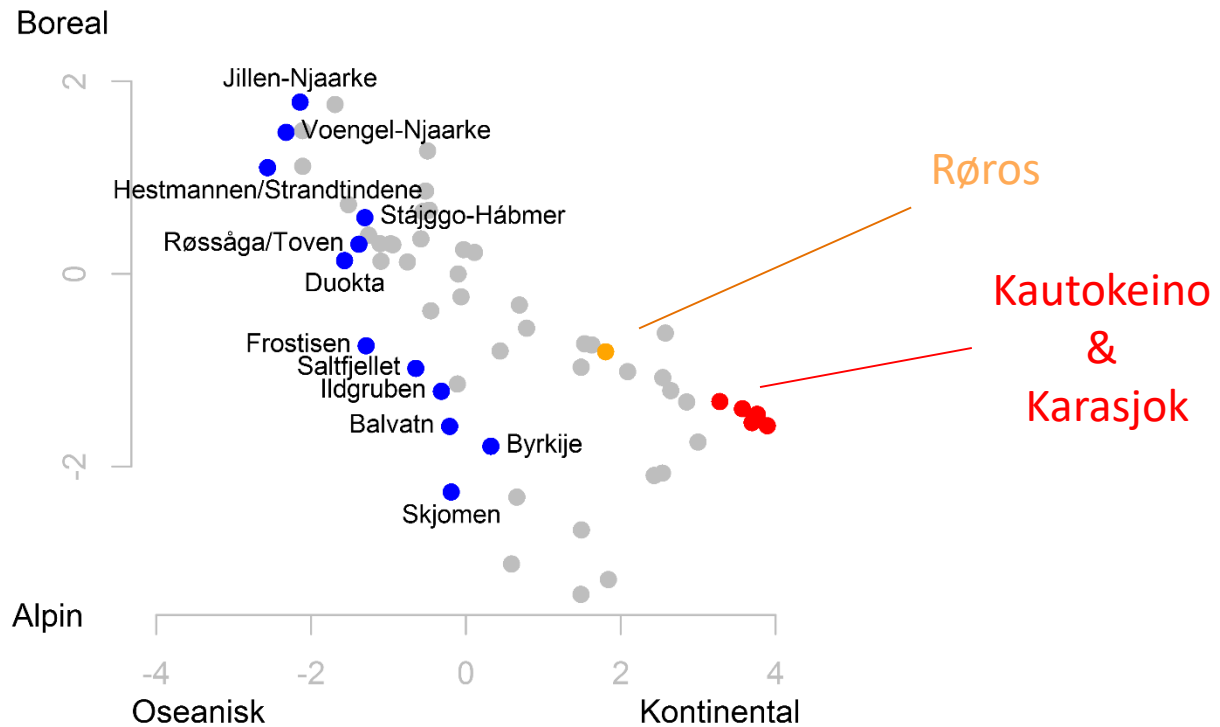
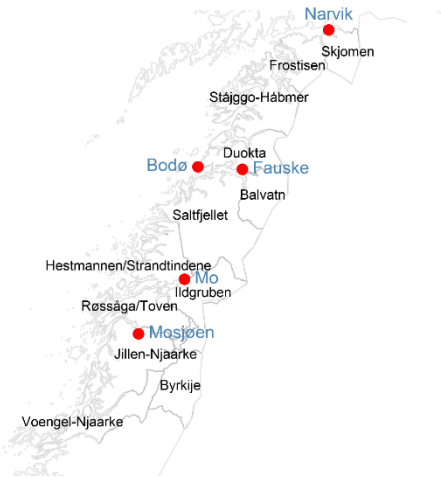


Mautz 1978

- Mattilgang gjennom vinteren bestemmer antall/bestandsvekst
- Mattilgang gjennom sommeren bestemmer vekst/størrelse  
(Klein 1965)



# Grad av kontinentalitet



# Data som er brukt

---

Reintall, Slaktedyr, Slaktevekter, NDVI

~1982 

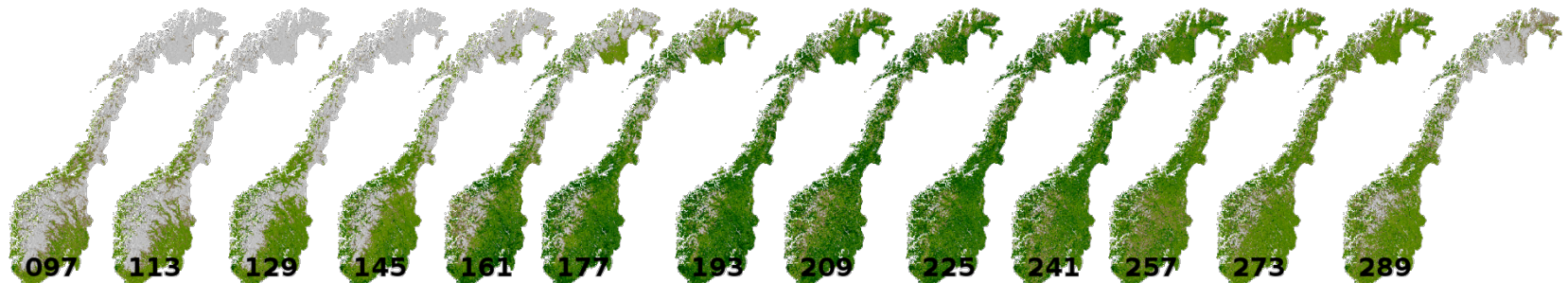
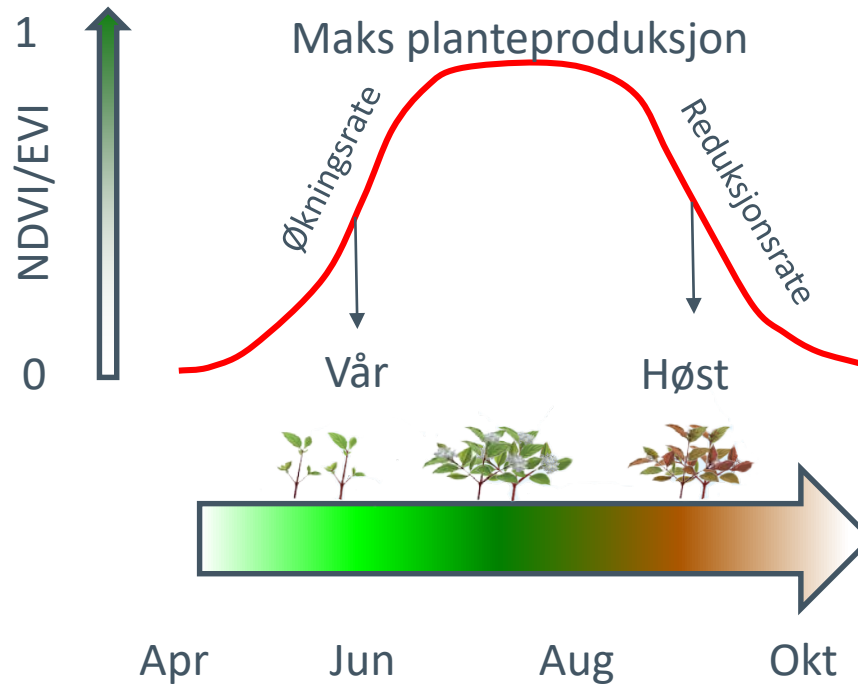
---

Gaupe 1997 

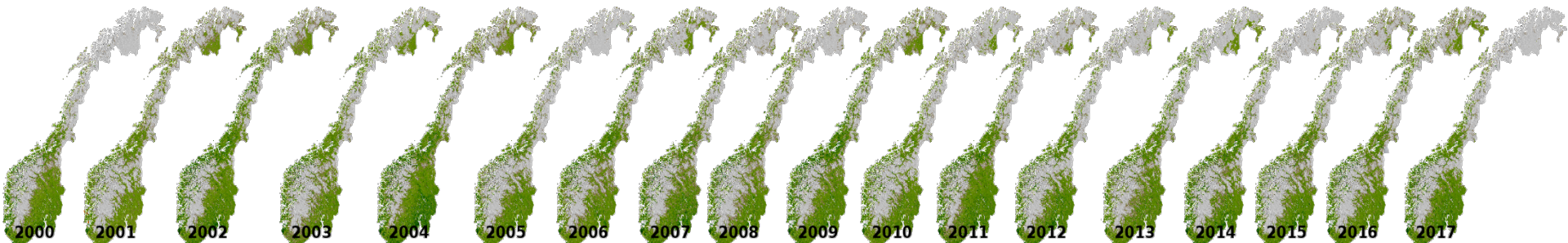
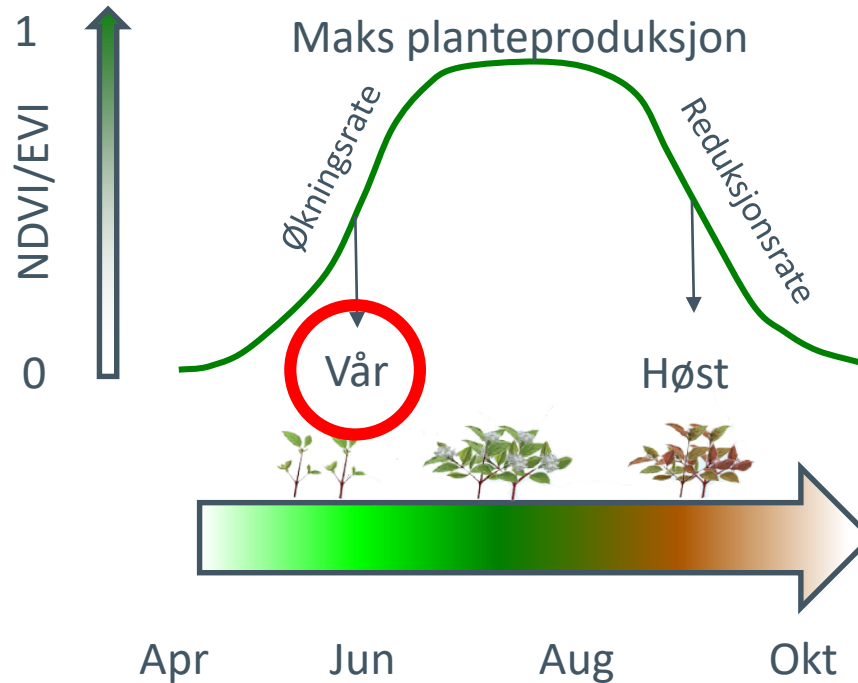
Jerv 2000 

Bjørn 2006 

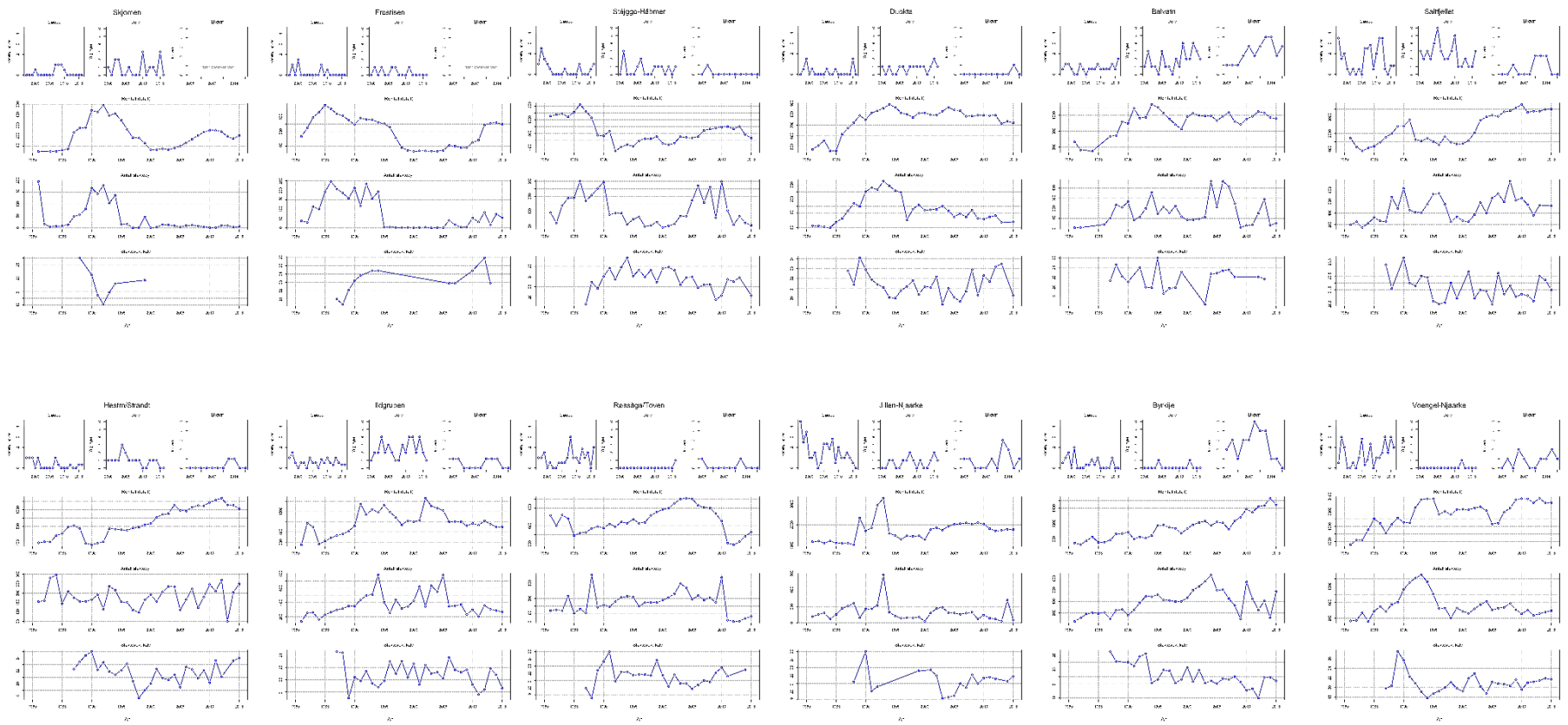
# Satellittmålinger av beiteforhold



# Satellittmålinger av beiteforhold



# Samlet sett mye informasjon



# Det kan gå galt....

## COMMENT

**SOCIETY** Re-imagine our institutions to harness collective intelligence p.561

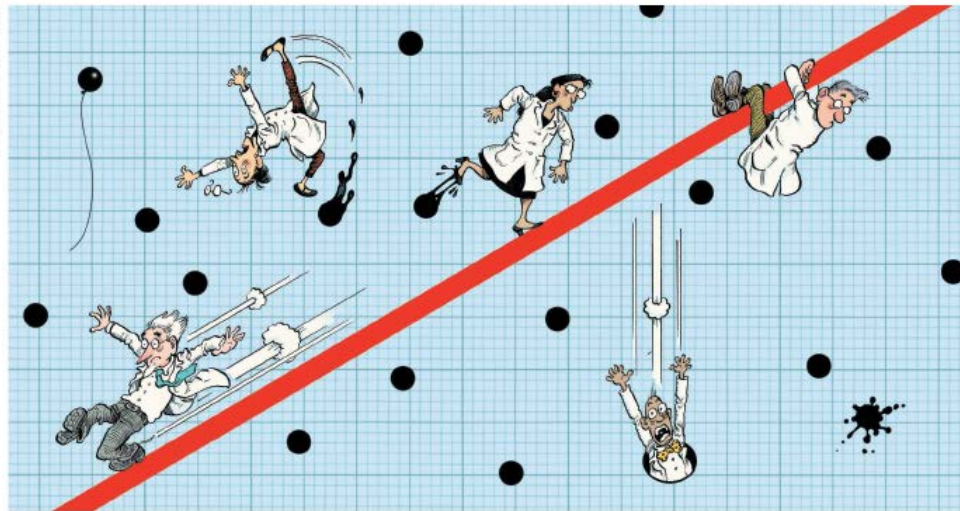
**RESEARCH MANAGEMENT** How to structure and support teams for effectiveness p.562

**POLICY** Ban on bear hunting balances societal values p.565



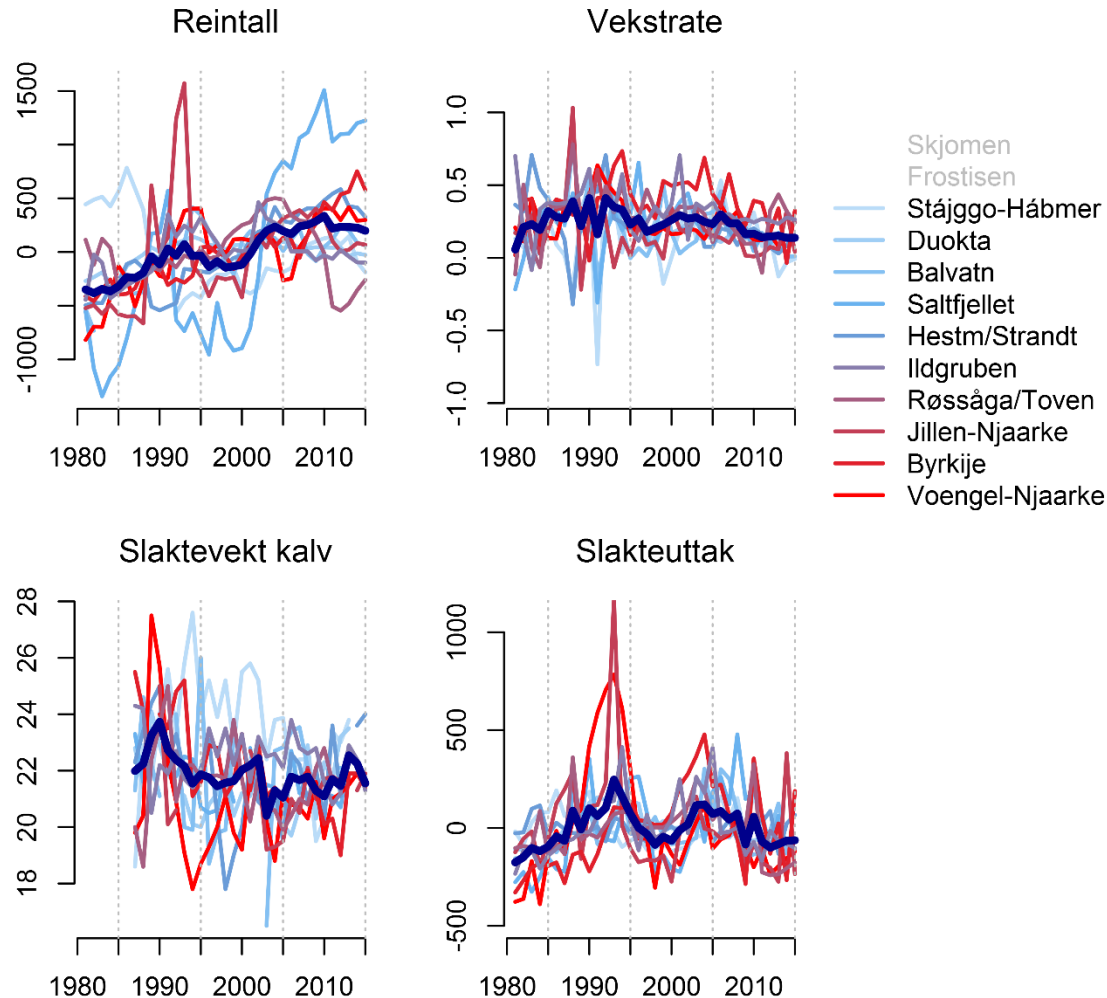
**OBITUARY** Gilbert Stork, synthesis pioneer, remembered p.566

ILLUSTRATION BY DAVID PARKINS

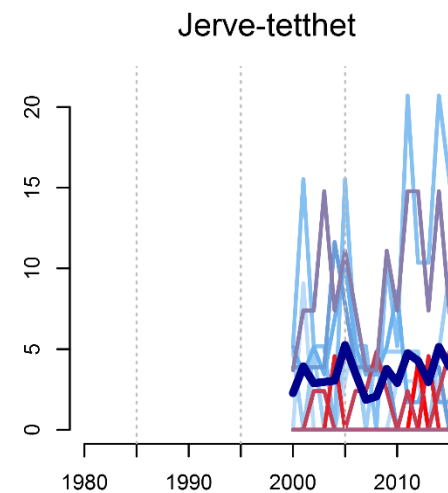
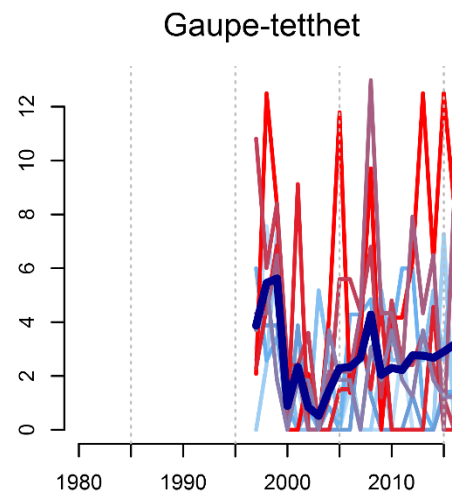
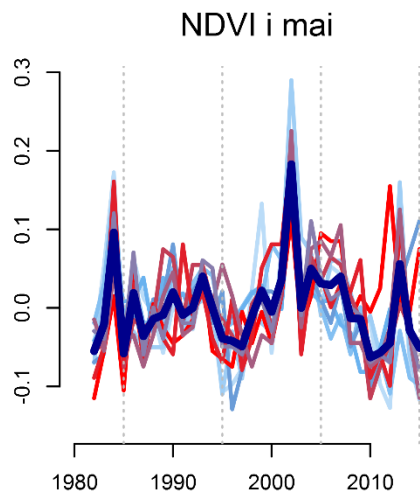


### Five ways to fix statistics

# Oversikt – trender i Nordland

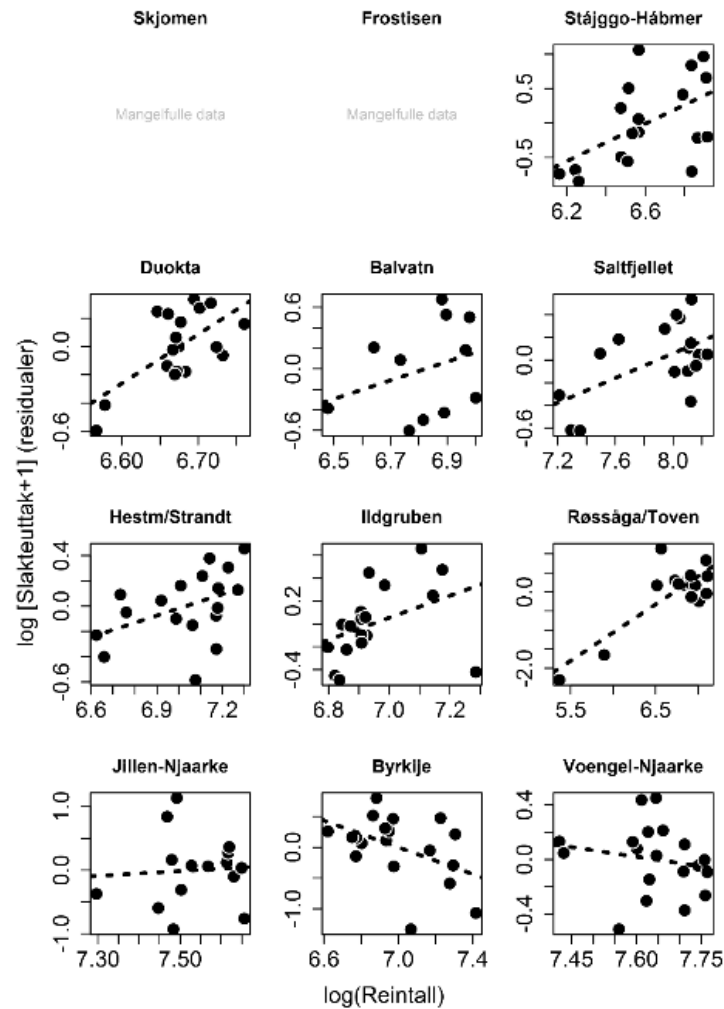


# Oversikt – trender i Nordland

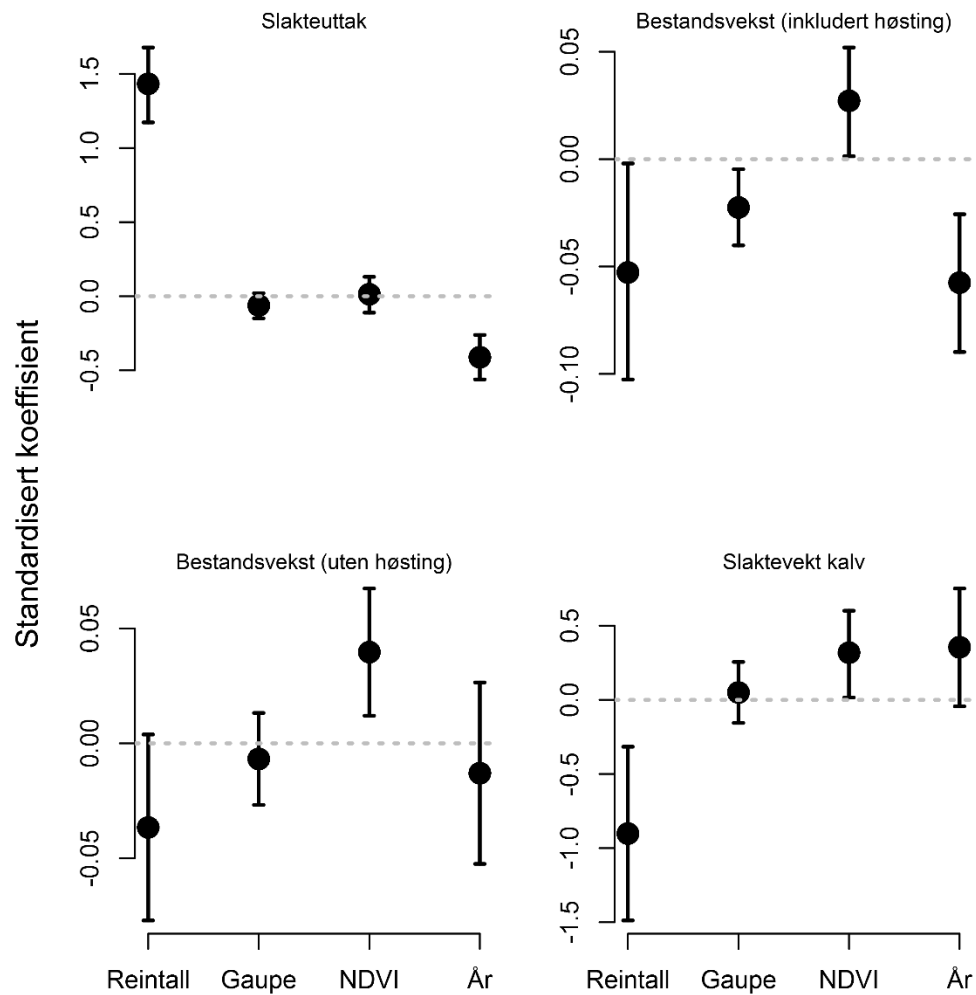




# Slakteuttak og reintall

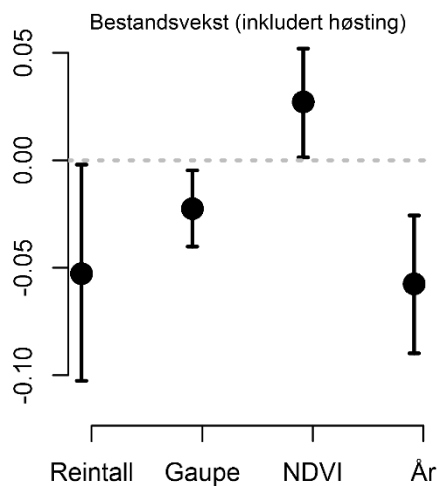


# Relativ betydning

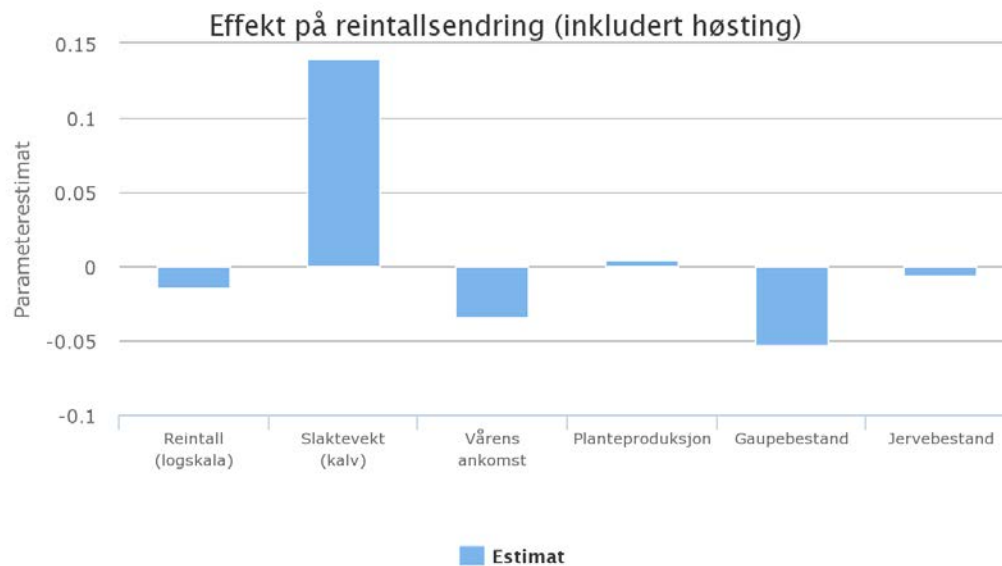


# Nordland vs 'Norge'

## Nordland

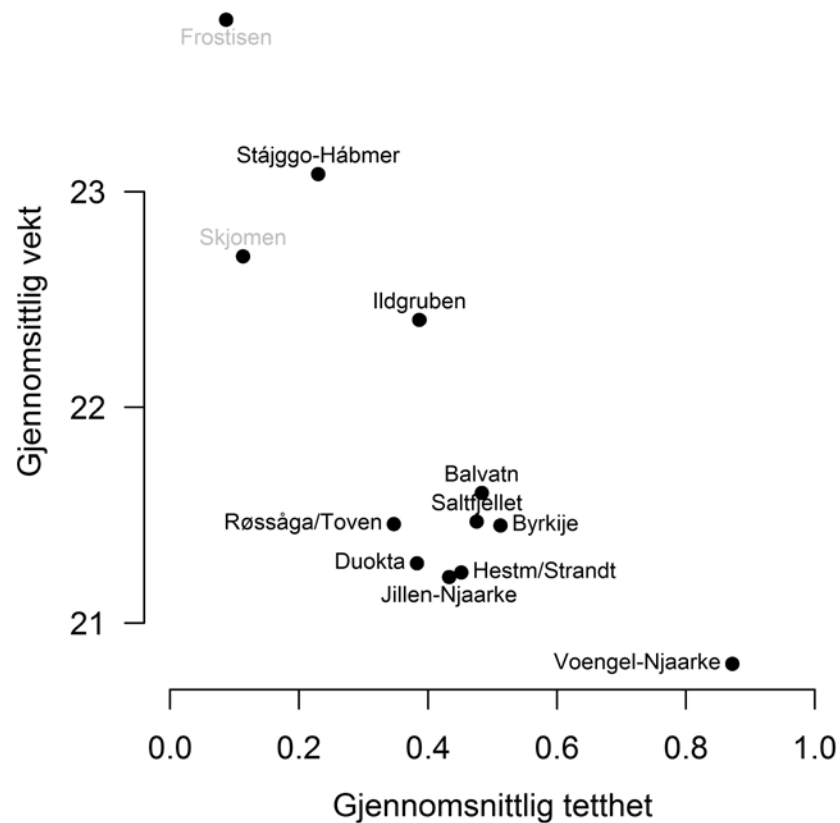


## Hele Norge



reinbase.no

# Tetthet og vekt på kalv



# Konklusjon

---

- Reintallet har gått opp, men ingen tilsvarende økning i slakteuttaket over tid
- Liten nedgang i slaktevektene (400 gr /10år)
- Økt reintall gir lavere vekter og bestandsvekst
- Gaupe påvirker bestandsveksten negativt
- Negativ utvikling de siste ~20 årene
- Variasjon mellom distriktene

# Kunnskapsbehov

---

- Individbasert vektutvikling
  - ▶ Produksjon og tap
  - ▶ Sesongmessig vektutvikling
- Drapstakter hos rovvilt
- Effekter av vinterklima
- Effekter av arealinngrep
- Driftsforhold