

# Growing wildlife populations and trophic rewilding in Sweden *plus some insights from African systems*

Joris Cromsigt, Megafauna & Sustainability unit

Senior lecturer @ Dept. of Wildlife, Fish & Environmental studies, SLU,  
Umeå, Sweden

Honorary Professor @ Centre for African Conservation Ecology, Nelson  
Mandela University, Port Elizabeth, South Africa

Lecturer @ Copernicus Institute of Sustainable Development, Utrecht  
University, the Netherlands



20 years of experience working in South African systems  
Extensive experience in Scandinavian, Dutch and Polish (Białowieża  
Primeval Forest) systems



# The Netherlands: (in)famous for its Rewilding "experiments"



These are wild animals  
according to Dutch  
government regulations

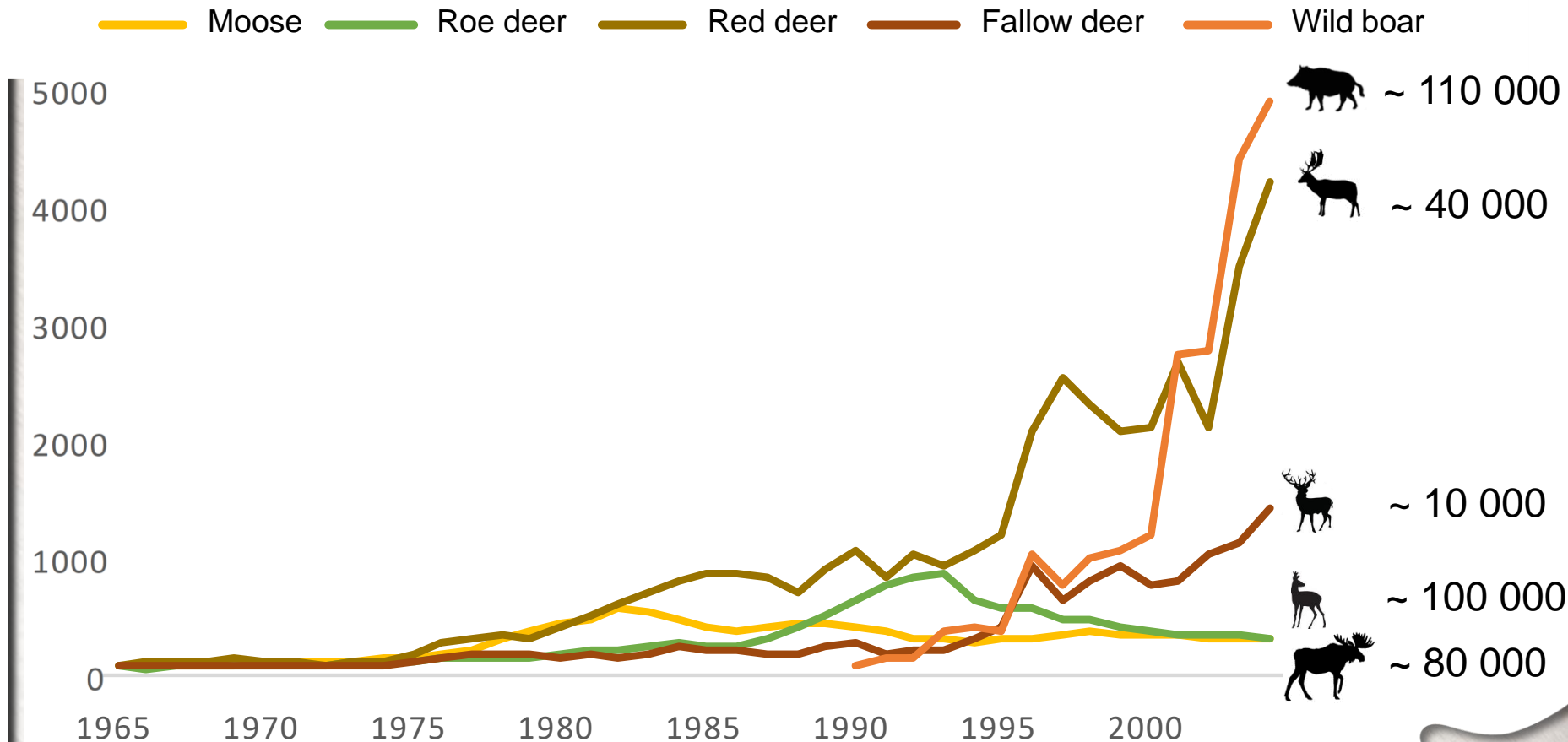






# Growing wildlife populations: large changes in Sweden's ungulate community

Relative increase in N of individuals shot (1965-2004)

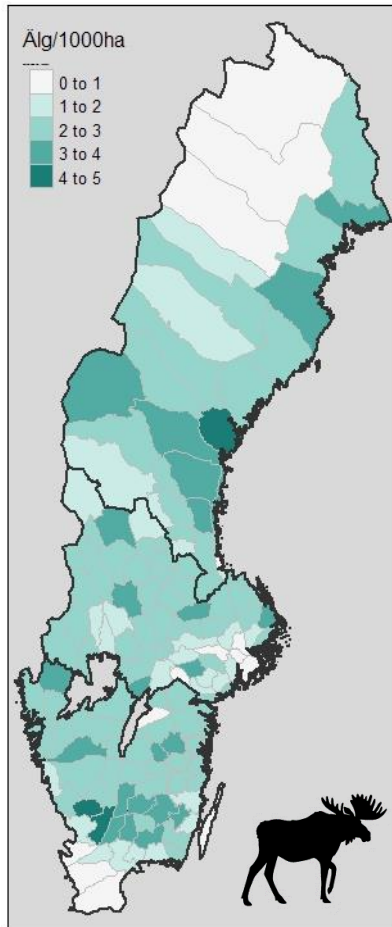




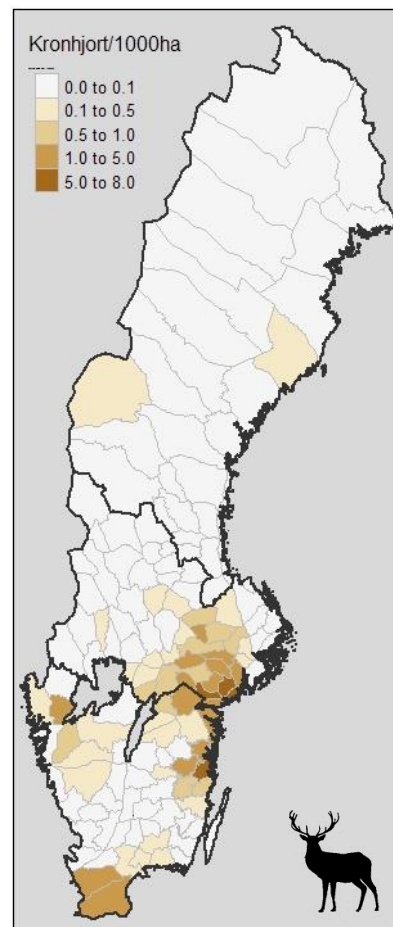
# Expansion of deer species inland and northwards

Bag statistics per Moose Management Area for 2015-2016 hunting year

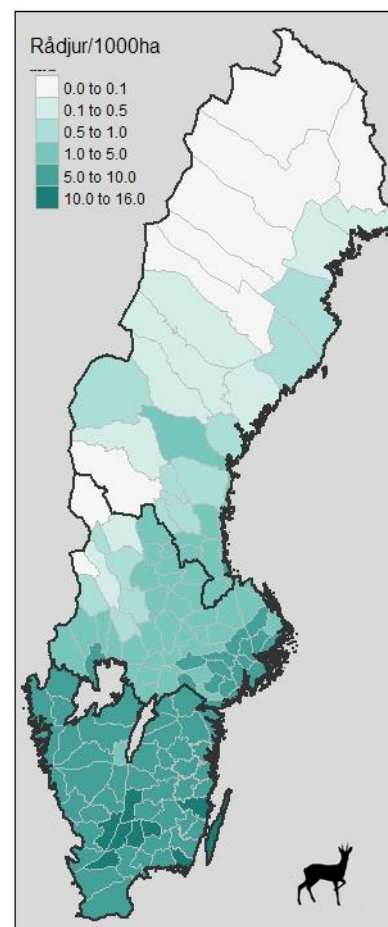
Moose



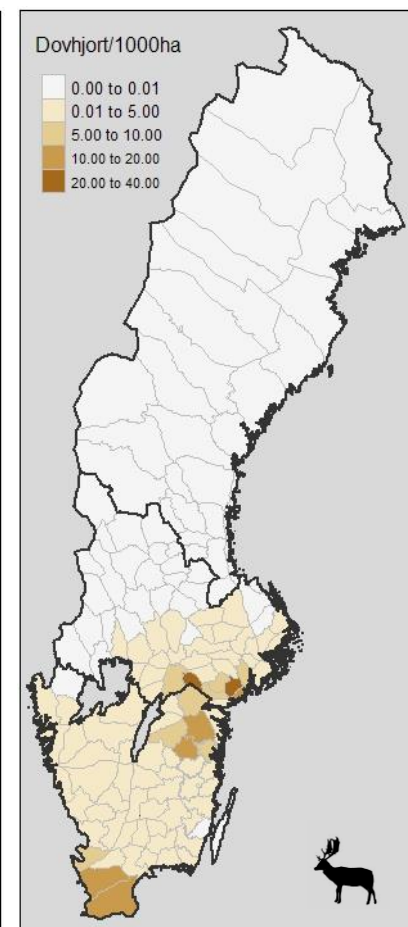
Red deer



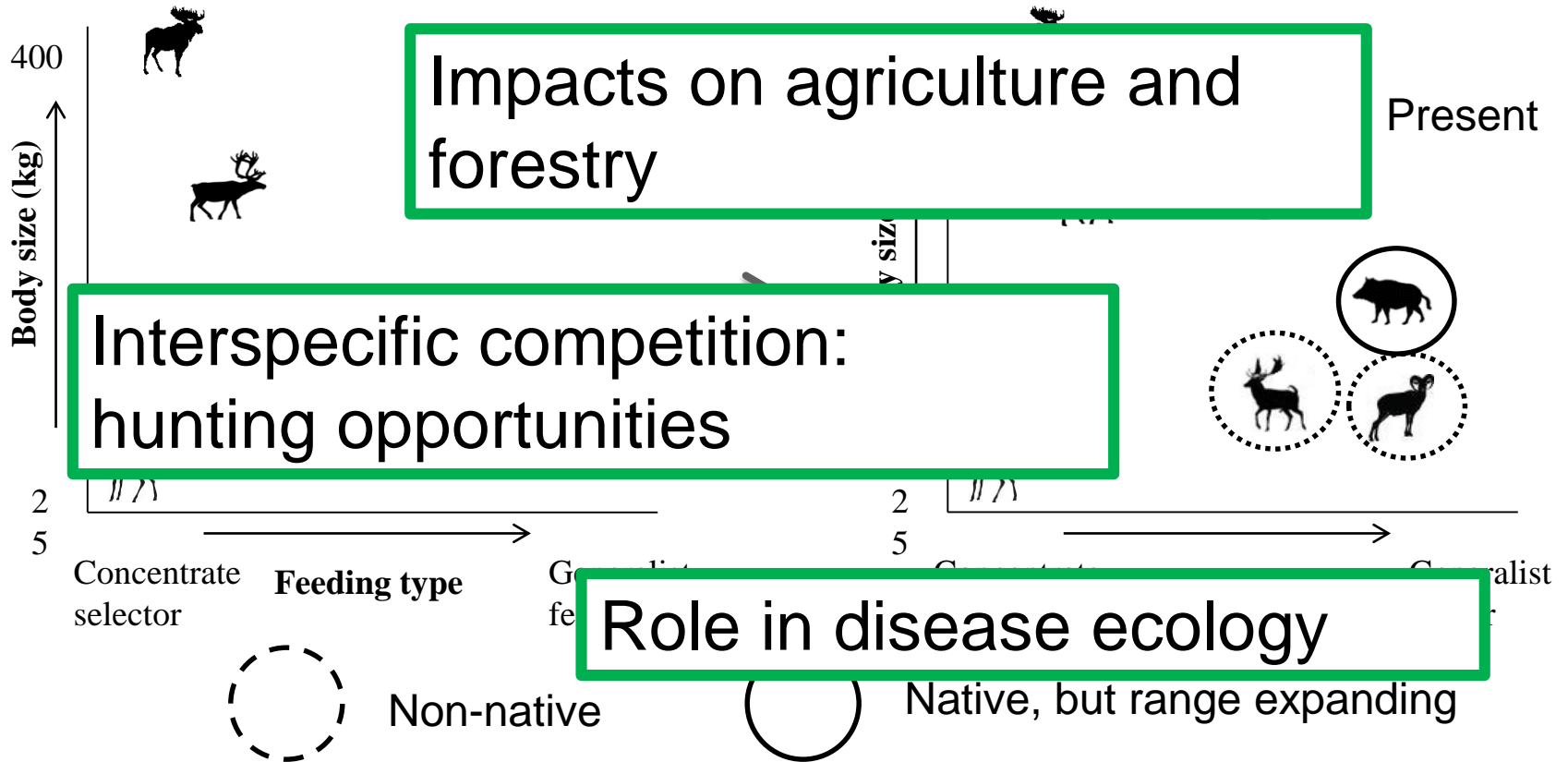
Roe deer



Fallow deer



## *Beyond Moose* program: Consequences of ungulate rewilding



# Opportunities for Trophic rewilding in Sweden

Challenge to conserve species that are adapted to open ecosystems





Connected to the loss of extensive farming and land abandonment  
i.e., biodiversity connected to "anthropogenic habitat"

THE ECOLOGICAL SOCIETY OF AMERICA  
**Frontiers in Ecology  
and the Environment**

Review |  Full Access

**Farmland abandonment: threat or opportunity for biodiversity  
conservation? A global review**

Cibele Queiroz , Ruth Beilin, Carl Folke, Regina Lindborg

First published: 01 June 2014 | <https://doi.org/10.1890/120348> | Citations: 123

**Land abandonment, landscape, and biodiversity: questioning the restorative  
character of the forest transition in the Mediterranean**

[Iago Otero](#)<sup>1,2</sup>, [Joan Marull](#)<sup>3</sup>, [Enric Tello](#)<sup>4</sup>, [Giovanna L. Diana](#)<sup>3</sup>, [Manel Pons](#)<sup>3</sup>, [Francesc Coll](#)<sup>3</sup> and [Martí Boada](#)<sup>2</sup>

Ecology and Society **20**(2): 7


[Biodiversity and Conservation](#)

December 2011, Volume 20, [Issue 14](#), pp 3645–3662 | [Cite as](#)

**Abandoned military training sites are an overlooked  
refuge for at-risk open habitat bird species**

Authors

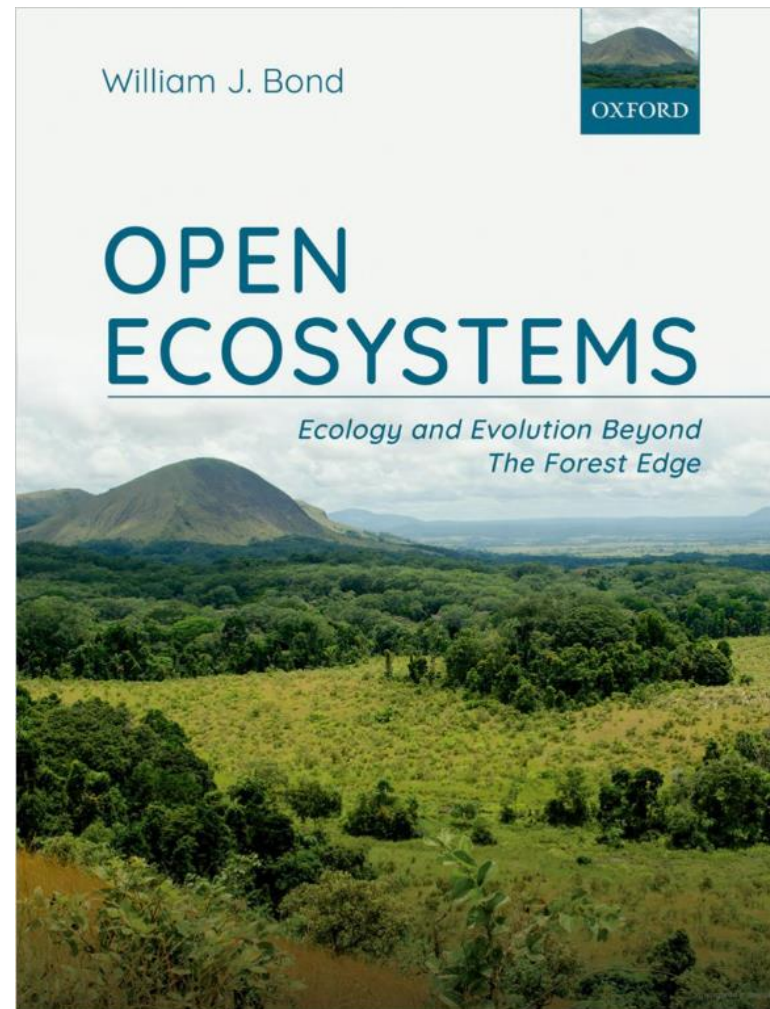
[Authors and affiliations](#)

Jiří Reif , Pavel Marhoul, Oldřich Čížek, Martin Konvička

# A African perspective on this



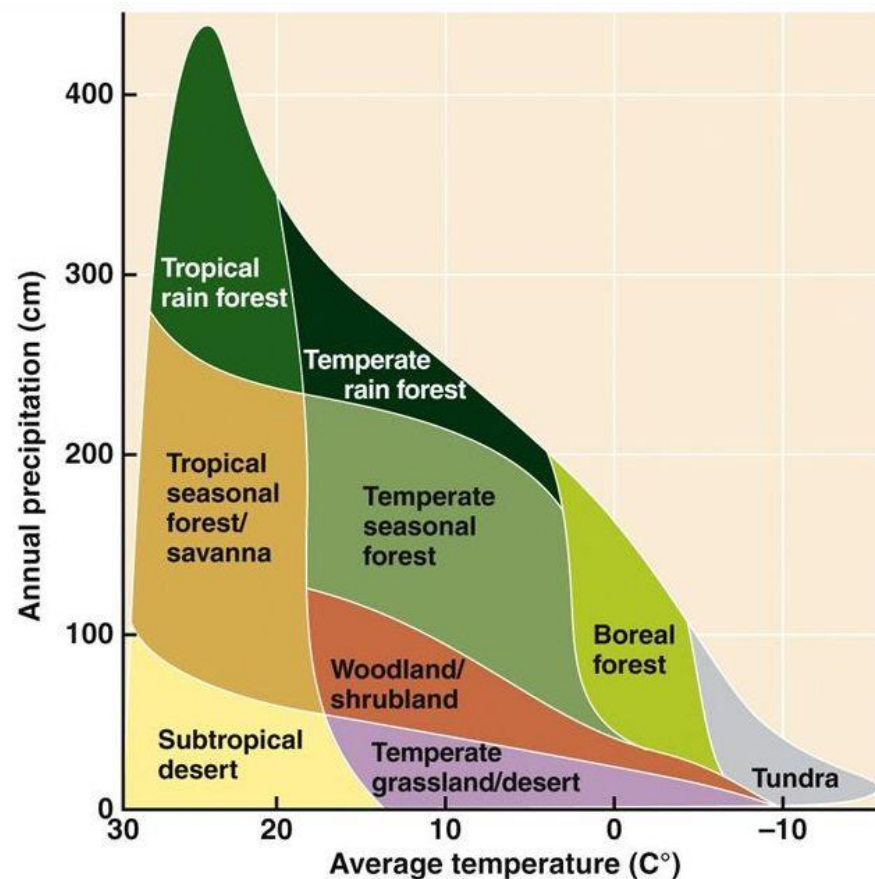
William J. Bond





# Challenging traditional view and definition of biomes

- Biomes as climate-controlled units (whittaker's diagram)



# Climate and soils DO NOT rule the world

- Plant consumers (fire, herbivory) control many biomes

*Journal of Vegetation Science* 16: 261-266, 2005  
© IAVS; Opulus Press Uppsala.

261

## INVITED PERSPECTIVE

**Large parts of the world are  
brown or black:  
A different view on the 'Green  
World' hypothesis**

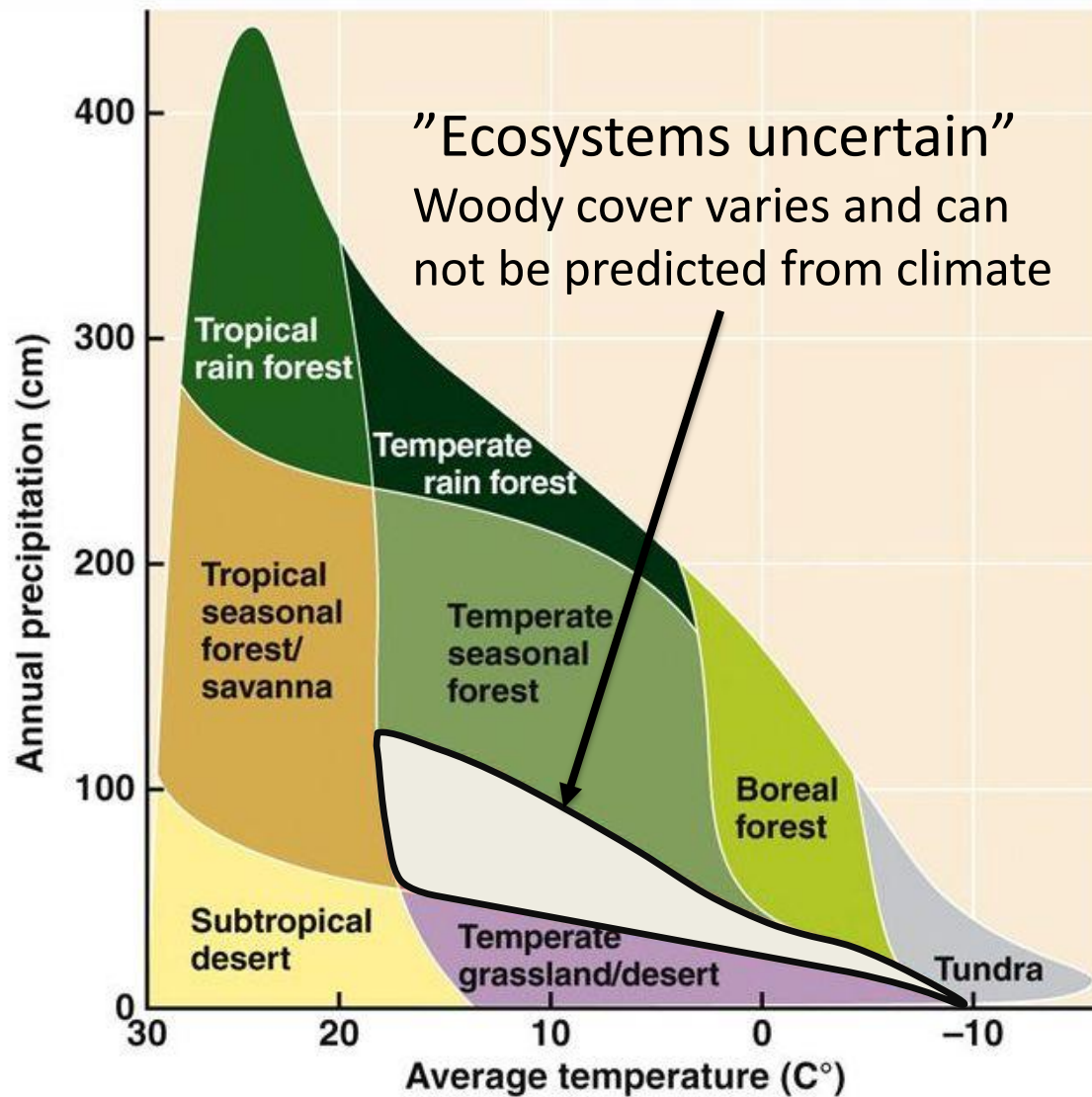
**Bond, William J.**

*Botany Department, University of Cape Town, Private  
Bag, Rondebosch, 7701, South Africa;  
Fax +27 216504041; E-mail bond@botzoo.uct.ac.za*



*William J. Bond*

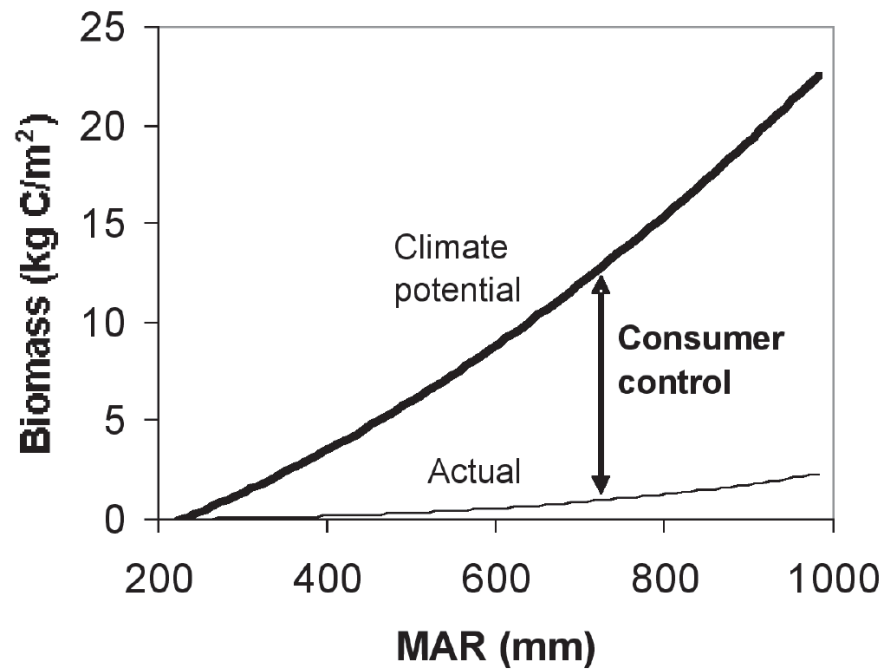




PRINCIPLES OF LIFE, Figure 42.10  
© 2012 Sinauer Associates, Inc.

Whittaker, RH. 1975. *Communities and Ecosystems*, Bond 2005

# Consumers can strongly control woody biomass



Journal of Vegetation Science 16: 261-266, 2005  
© IAVS: Open Access Uppsala

261

## INVITED PERSPECTIVE

Large parts of the world are  
brown or black:  
A different view on the 'Green  
World' hypothesis

Bond, William J.

Botany Department, University of Cape Town, Private  
Bag, Rondebosch, 7701, South Africa  
Fax +27 21 650 4041; E-mail: bond@bot2000.uct.ac.za



William J. Bond



# Open Ecosystems: consumer-controlled ecosystems or "ecosystems uncertain"

## Open Ecosystems

Fire-driven system

Black world



Herbivore-driven system

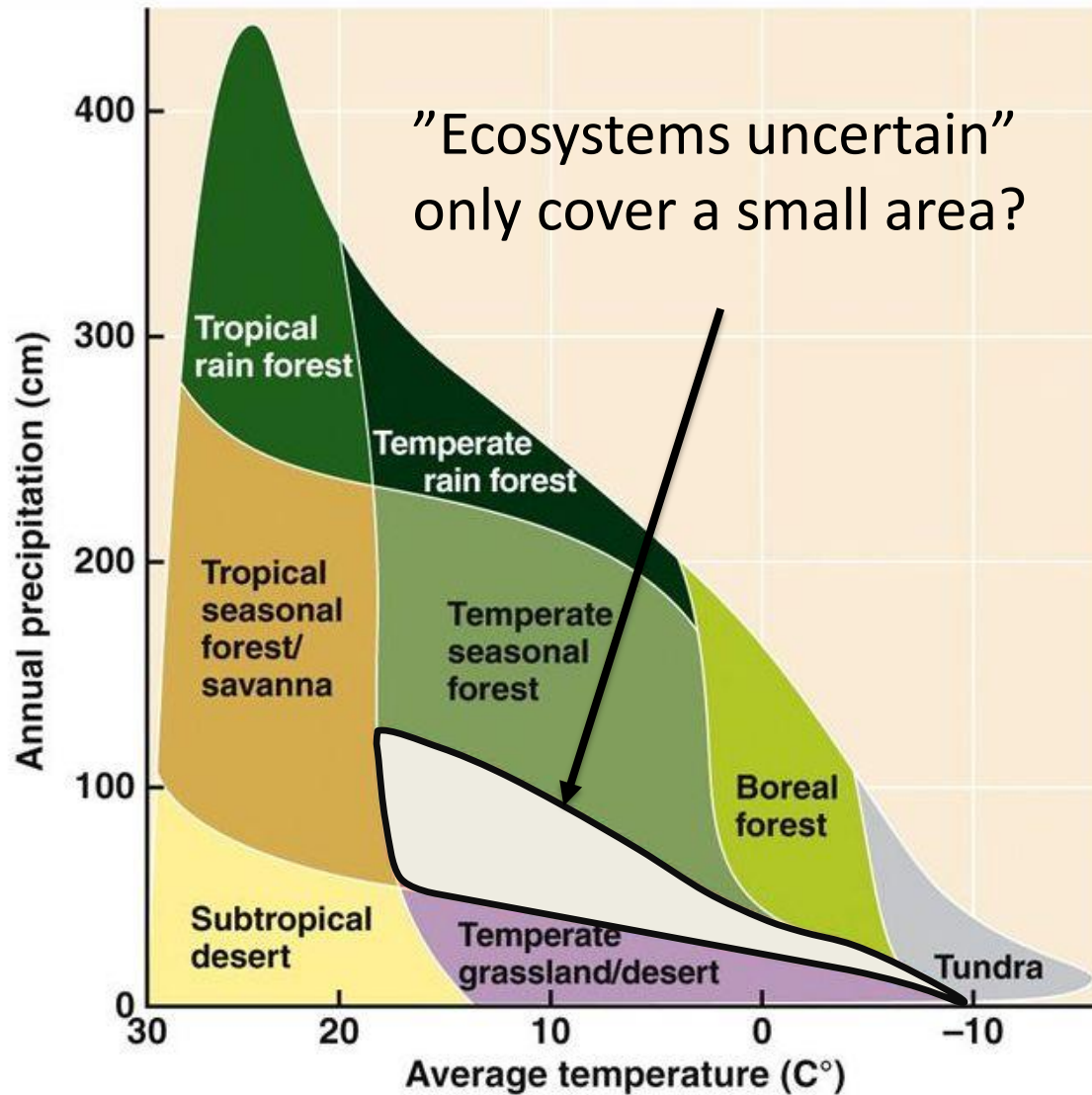
Brown world



Climate-driven system

Green world

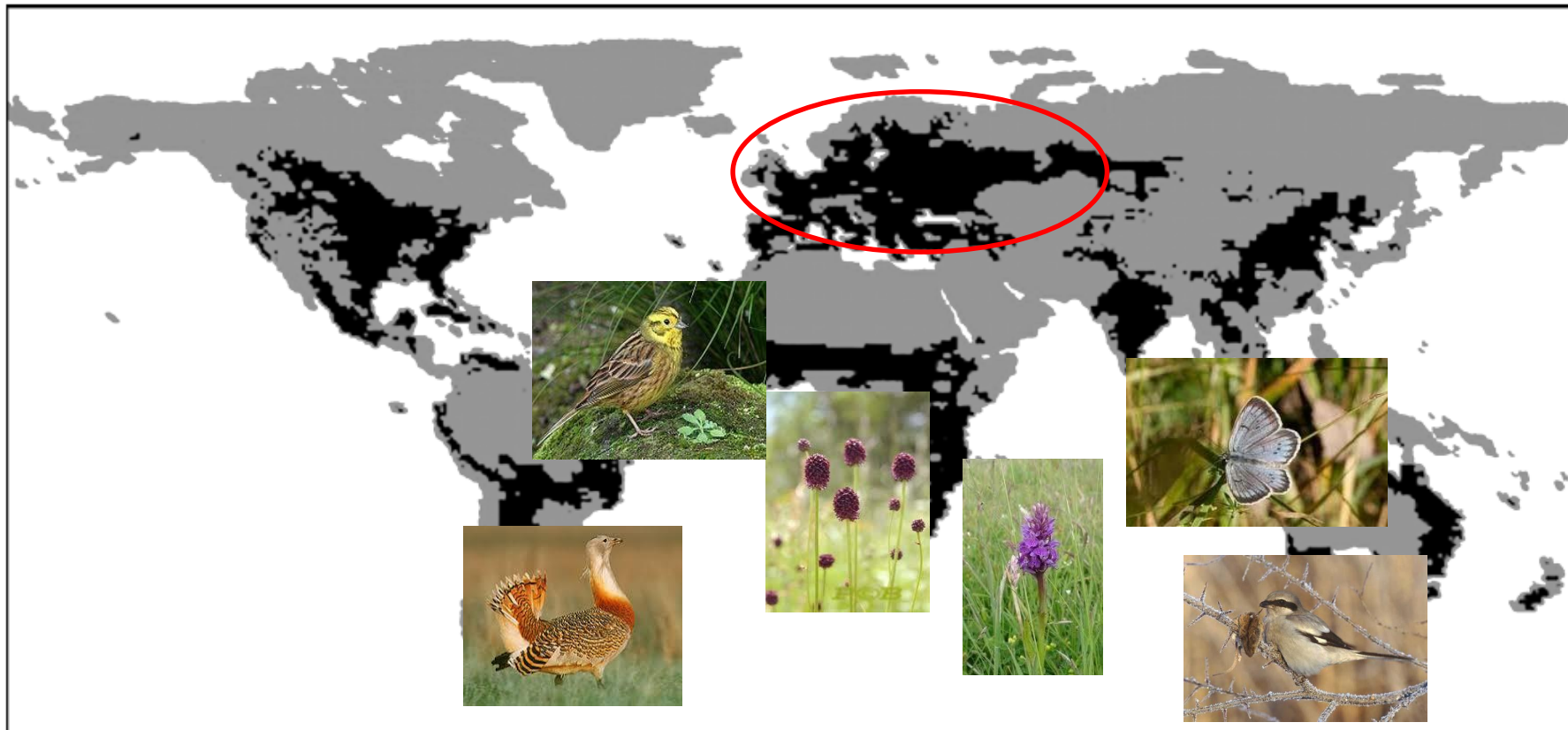




PRINCIPLES OF LIFE, Figure 42.10  
© 2012 Sinauer Associates, Inc.



# Large extent of the world are 'ecosystems uncertain'!



**Figure 5.1** Distribution of “ecosystems uncertain” (dark shading), which are areas categorized as either grasslands or one of the biomes dominated by woody plants in the Whittaker biome diagram (reprinted with permission from Bond, 2005).

# What does this mean in terms of rewilding?

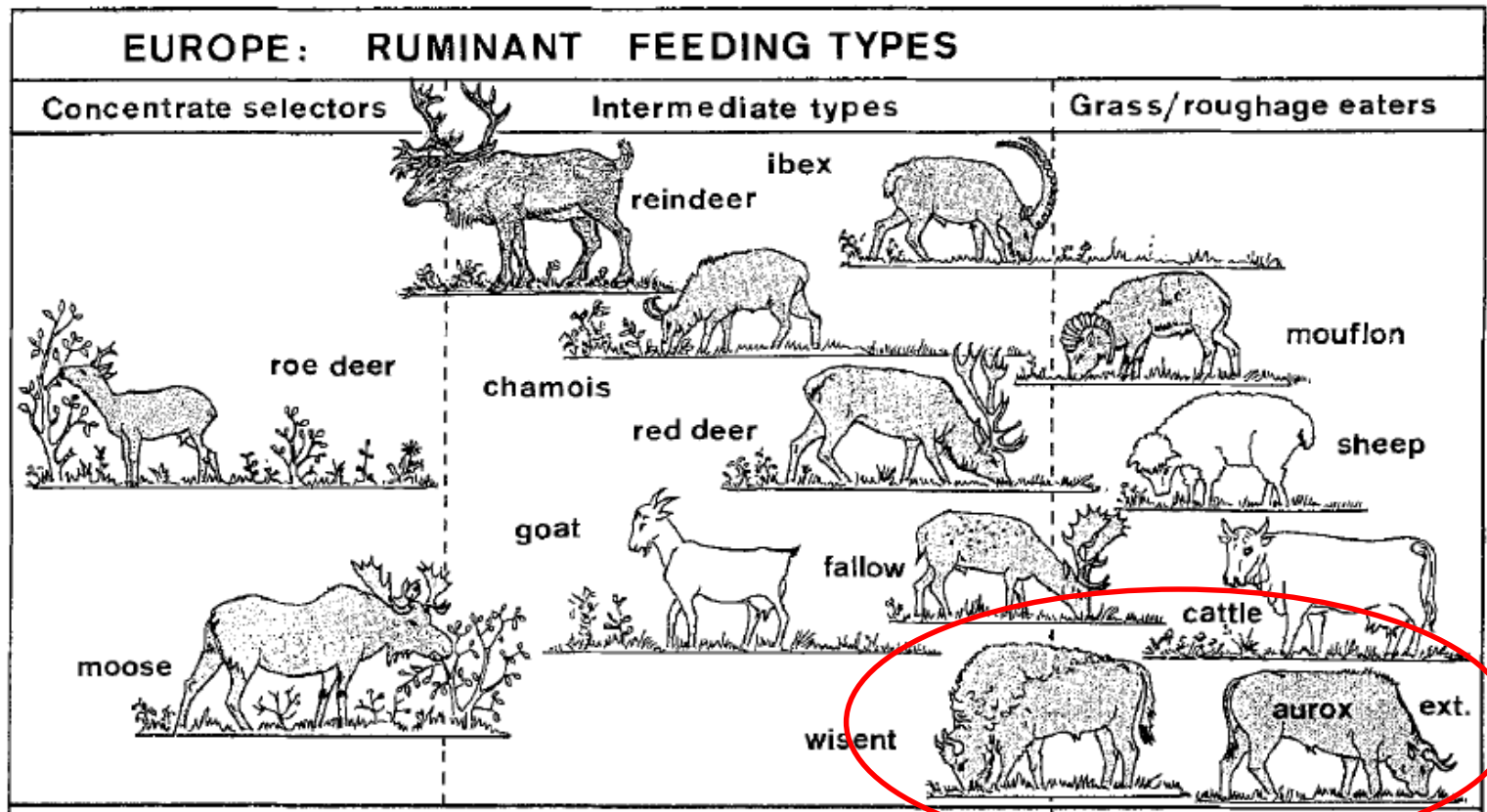
- Well ... calls for a paradigm shift
- Instead of restoring European open habitat specialists through restoring "anthropogenic habitats and drivers"
- We need to refocus on restoring Europe's Open Ecosystems through restoring its drivers -> fire and herbivory
  - i.e., Trophic Rewilding

Restore open ecosystems by restoring the role of consumers





# Restoring functionality in Europe's large herbivore community (large grazers)



Hofmann 1989. Oecologia 78: 443.

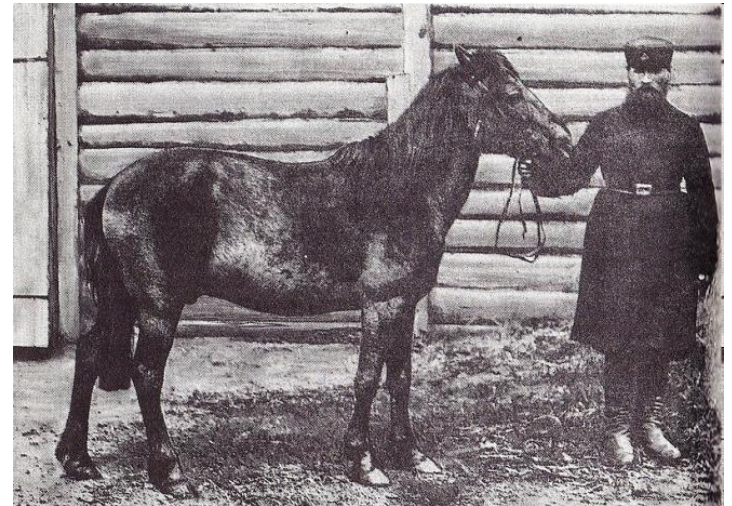
# Rewilding with free-ranging cattle and horses

As substitutes of extinct Aurochs and Tarpan

Aurochs went extinct in 1627



Tarpan went extinct in 1879

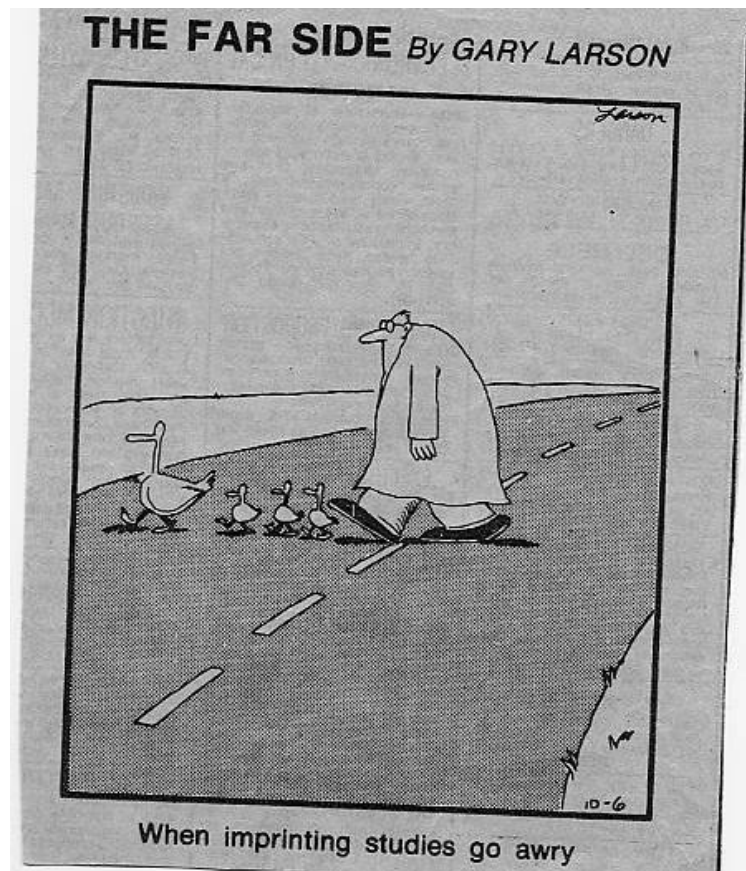


# Restoring Open Ecosystems through Trophic Rewilding = restoring herbivory AND fire





We need out-of-the-box experiments to start testing these ideas



# Fire and grazing experiment, Nordens Ark, Sweden

- Karin Amsten<sup>1</sup> (PhD student)
- Mats Niklasson<sup>1</sup> (main supervisor)
- Jenny Loberg<sup>1</sup>
- Joris Cromsigt
- Marcin Churski<sup>2</sup>
- Dries Kuijper<sup>2</sup>



<sup>1</sup>Nordens Ark Zoo & SLU

<sup>2</sup>Mammal Research Institute, Bialowieza, Poland





# Experiment replicated in 24 sites across Nordens Ark's Ekopark

5 seedlings per species per plot:  
Oak – *Quercus robur*  
Pine – *Pinus sylvestris*  
Spruce – *Picea abies*  
Birch – *Betula pendula*  
Lime – *Tilia cordata*

No grazing and no fire

No grazing and fire

Grazing and no fire

Grazing and fire

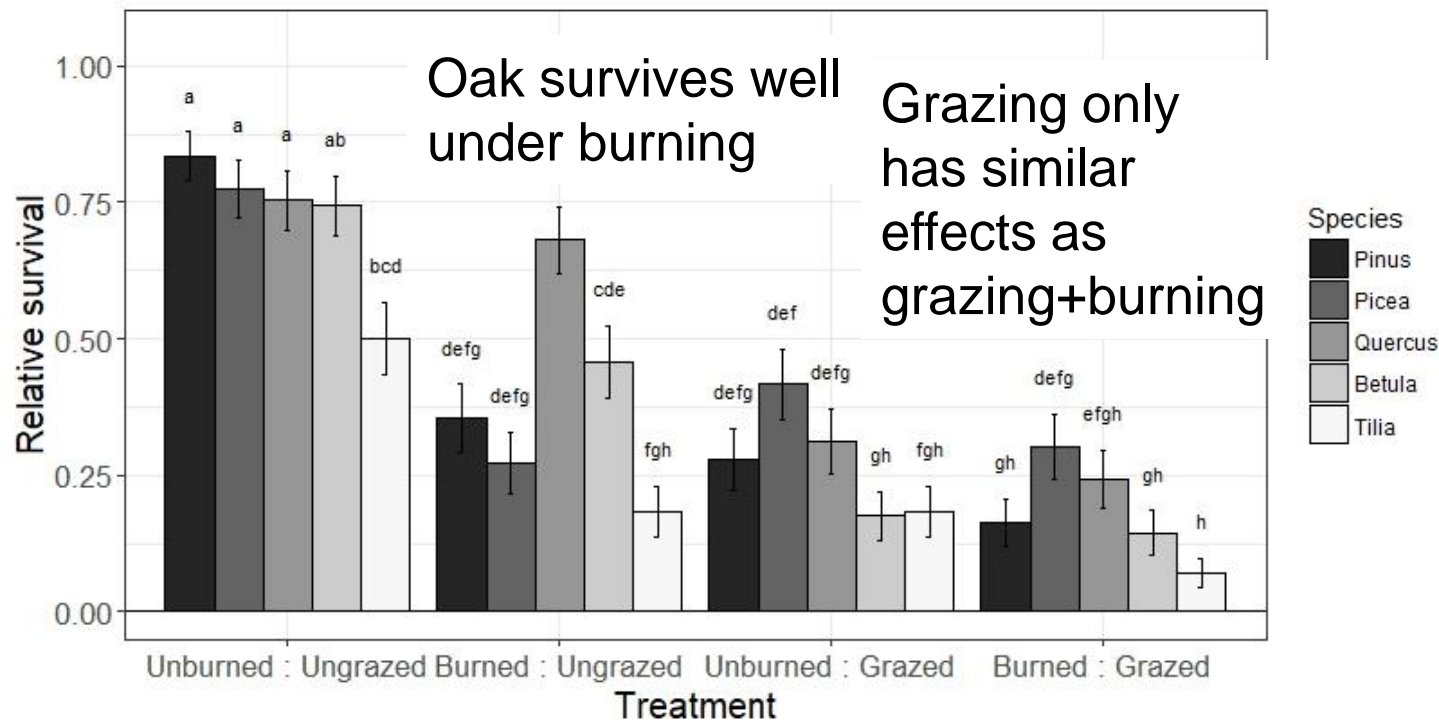


© Nordens Ark



# Survival after three years (2 spring burning events)

Scots pine
  Norway spruce
  Common oak
  Silver birch
  Small-leaved lime



Amsten et al. Submitted to New Phytologist

# Interaction between grazing and fire





# Grazing treatment hardly burnt

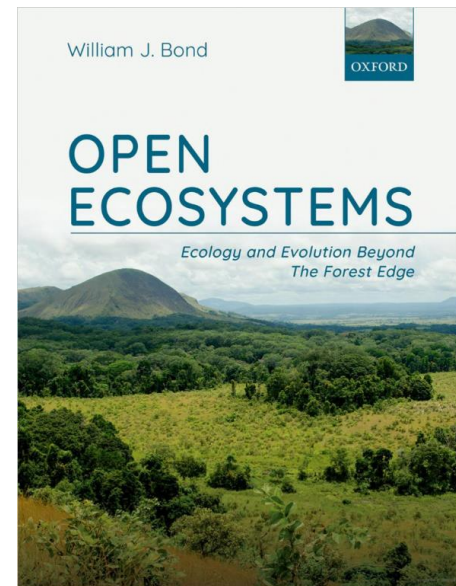


Grazing and fire



# Lots to learn still...

- Particularly from science coming out of southern hemisphere savannas and grasslands
- This can guide efforts to restore European Open Ecosystems through trophic rewilding



# ”Rewilding our minds”: rethink some of our terminology?

13<sup>th</sup> Eurasian Grassland Conference

Management and Conservation of **Semi-natural  
grasslands** from theory to practice

Sighișoara, Romania

20-24 September 2016



Citation from Otero et al. 2015. *Ecology and Society* 20:7.

”We (1) question the alleged relationship between land abandonment and ecosystem recovery; (2) show that the assumed restorative character of the forest transition is based on the underestimation of the ecological importance of nonforest habitats”



Thank you!

- Tobias Kuemmerle & Henrik Smith
- Kungl. Skogs- och Lantbruksakademien
- Knut and Alice Wallenberg foundation

### Välkommen till Kempestiftelserna

Stiftelserna J.C. Kempe och Seth M Kempes Minne

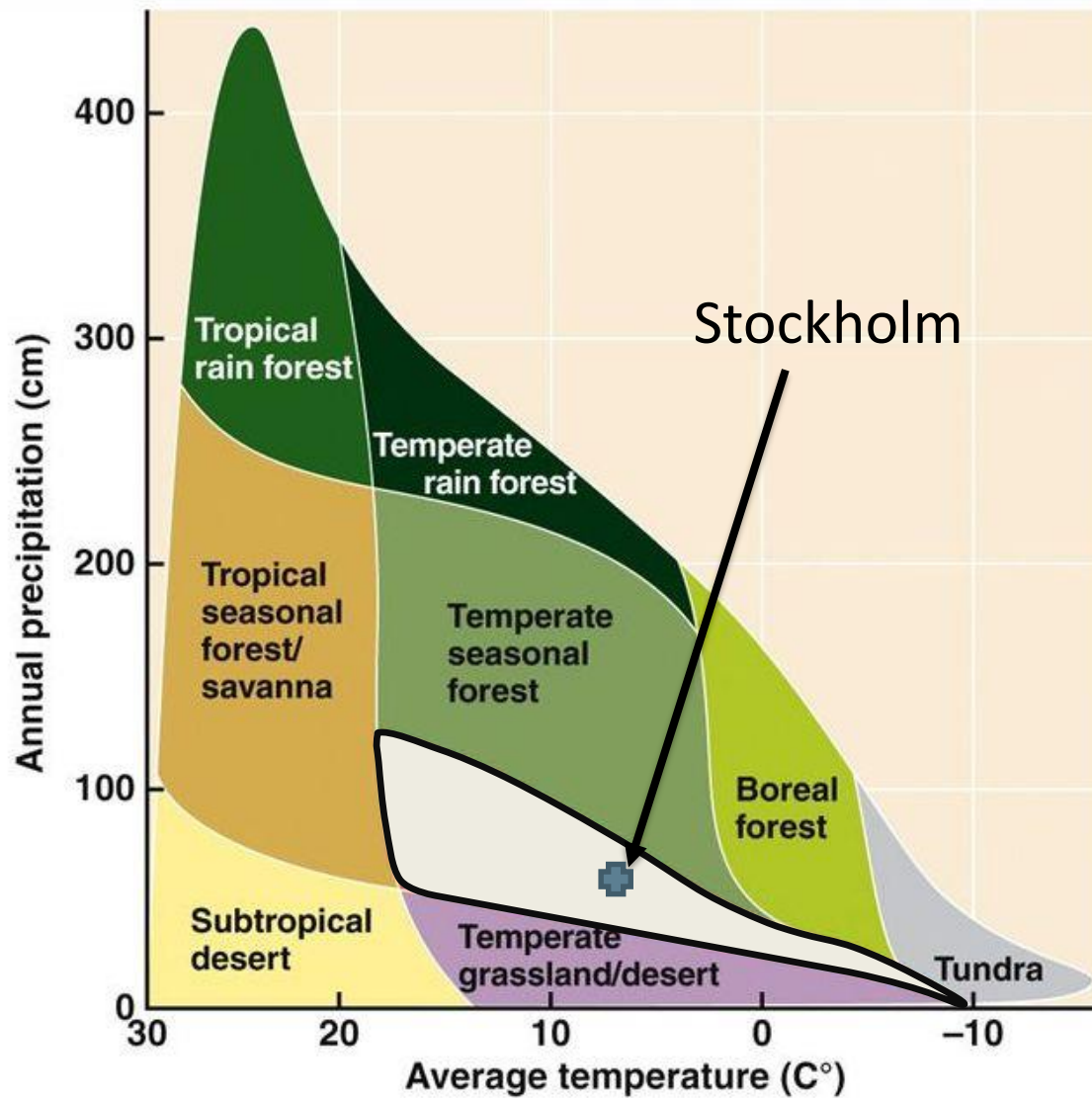


Syfte:

Att i fråga om Västerbottens, Västerbottens och Norrbottens län främja vetenskaplig forskning samt vetenskaplig och annan undervisning och utbildning, så och religiösa, välgörande, sociala, konstnärliga och andra därmed jämförbara kulturella ändamål, även som att främja nämnda läns jordbruksnäring.







*PRINCIPLES OF LIFE*, Figure 42.10  
© 2012 Sinauer Associates, Inc.