



# POPULATION DEVELOPMENTS IN GEESE WORLDWIDE

## – DRIVING FORCES

- Human persecution
- Agricultural intensification
- Adaptation by geese
- Climate change

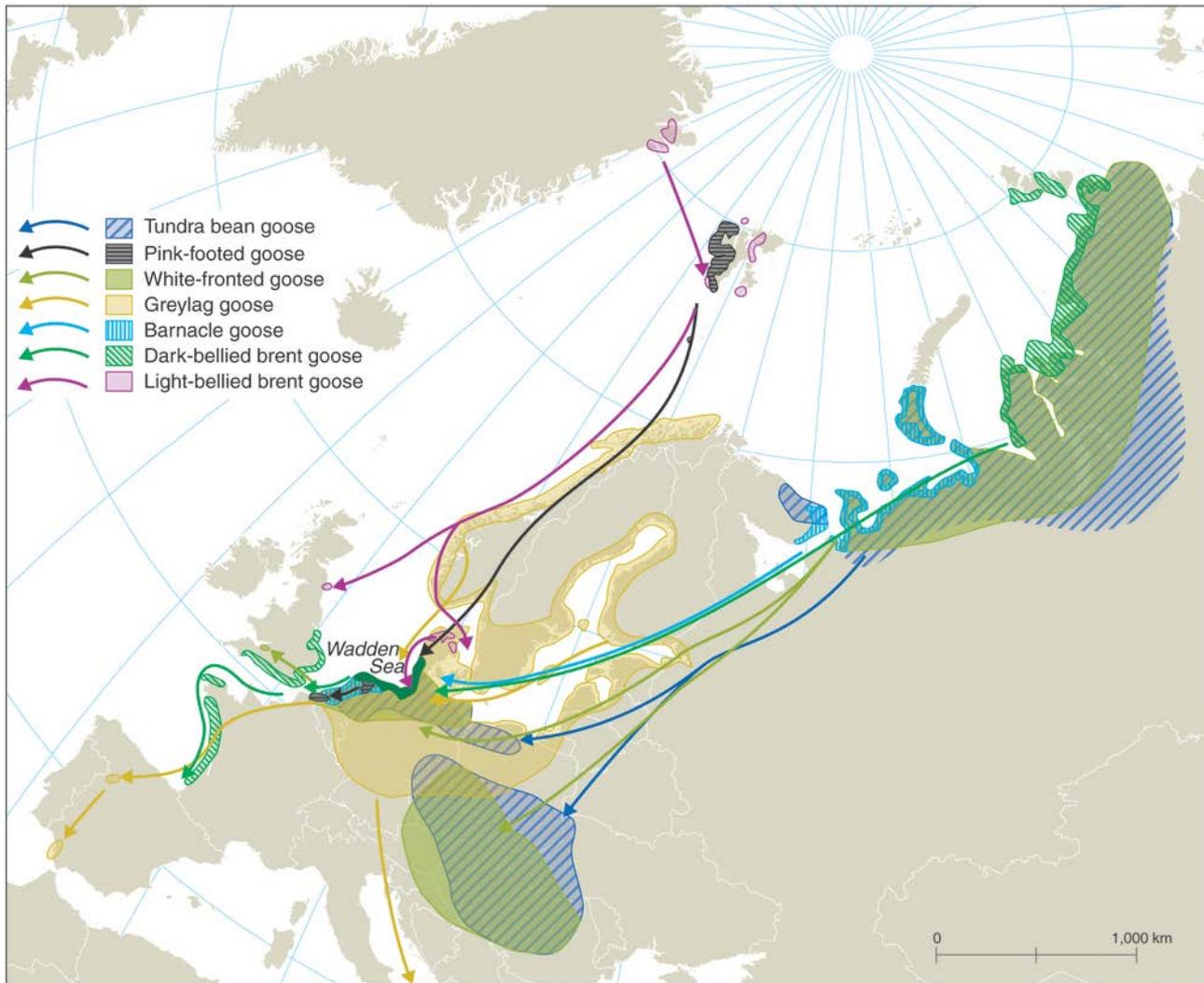
Jesper Madsen

Dep. of Bioscience, Aarhus University

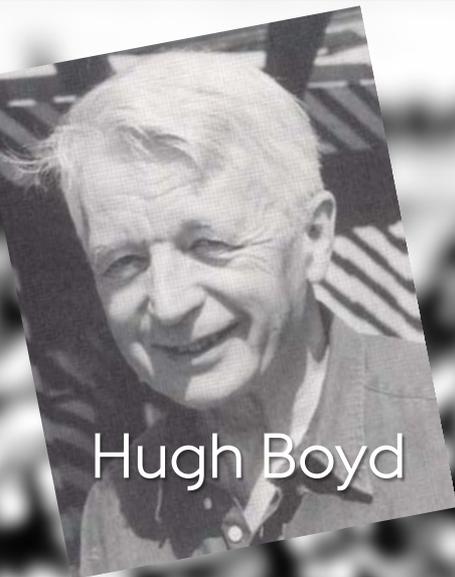
Denmark

Email: [jm@bios.au.dk](mailto:jm@bios.au.dk)

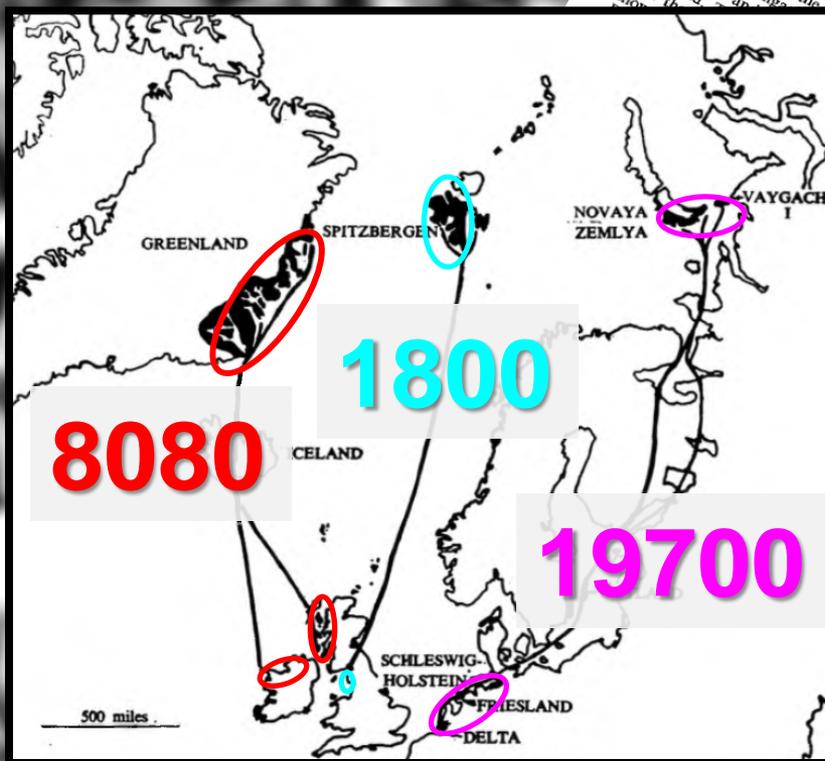




# LONG HISTORY OF MONITORING



Hugh Boyd



## THE NUMBER OF BARNACLE GEESE IN EUROPE IN 1959-1960

Hugh Boyd

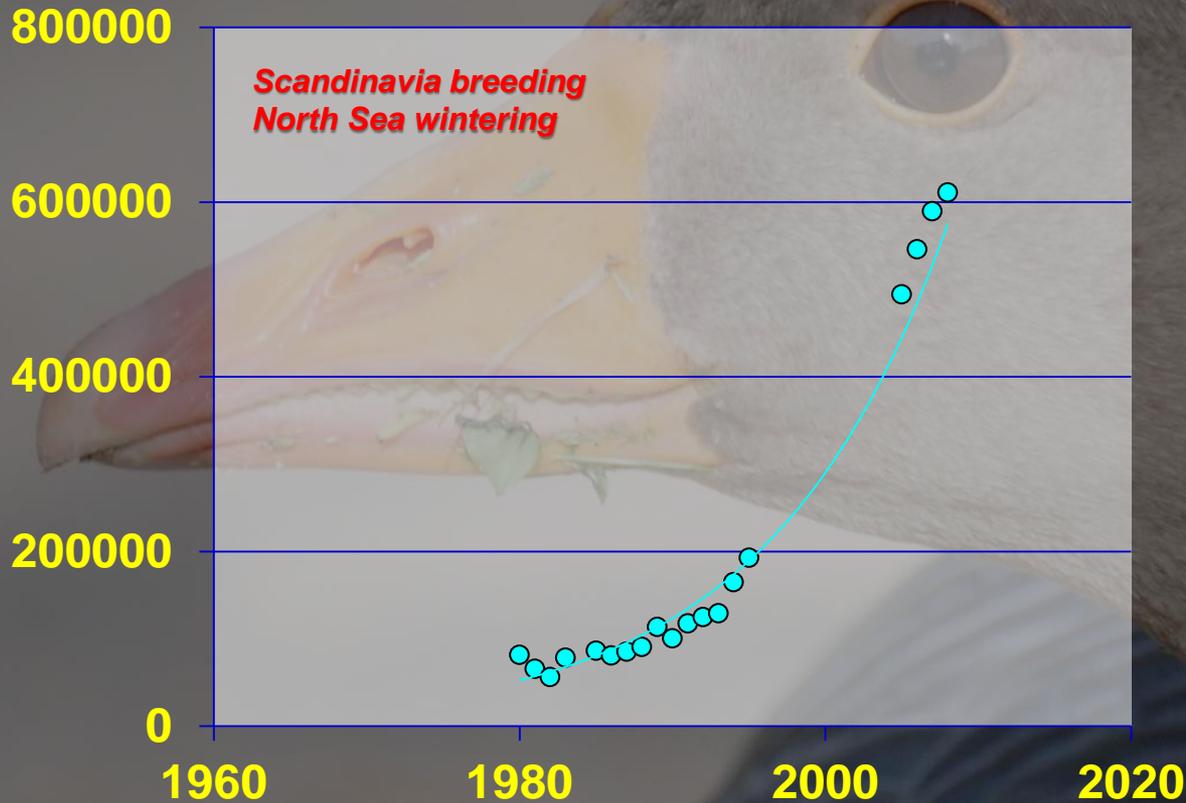
### Summary

A co-operative international inquiry in the winter of 1959-1960 resulted in an estimate of about 30,000 for the world population of *Bramia leucopsis*. At 1st December, 1959 there were about 11,100 in the Netherlands, 8,600 in Germany, 7,100 in Scotland and 2,800 in Eire. No other country is likely to have held more than a few stragglers at that date. Evidence from ringing and from observations on the proportions of first-winter birds in different flocks suggests that the birds probably include some from Novaya Zemlya and Spitzbergen, and also from the coast of the Netherlands and Germany. The Irish geese have apparently recovered in recent years from the depression they reached in 1945-1950, although aerial surveys in Sweden were in progress in 1959-1960 and are faring less well than the other two stocks.

### Introduction

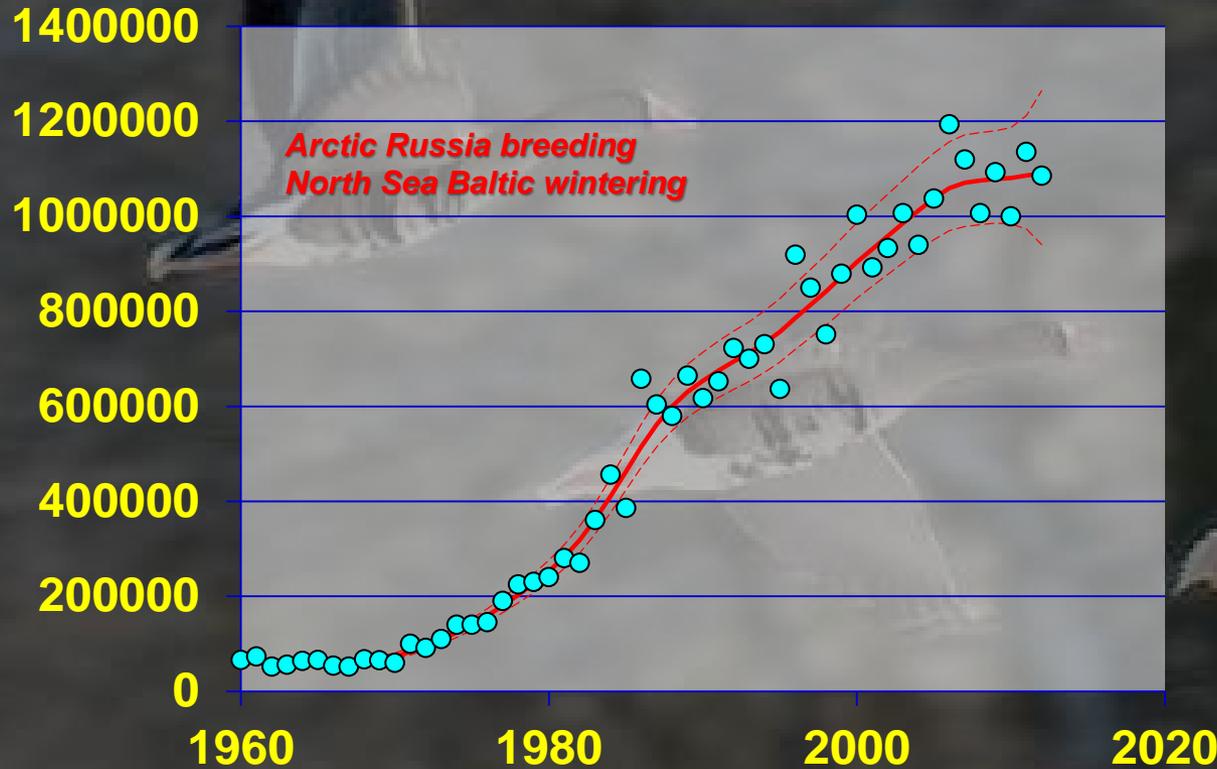
On behalf of the Trust, an investigation into the dynamics of the Barnacle Goose, *Bramia leucopsis*, was conducted in 1959-1960.

# Greylag Goose *Anser anser*



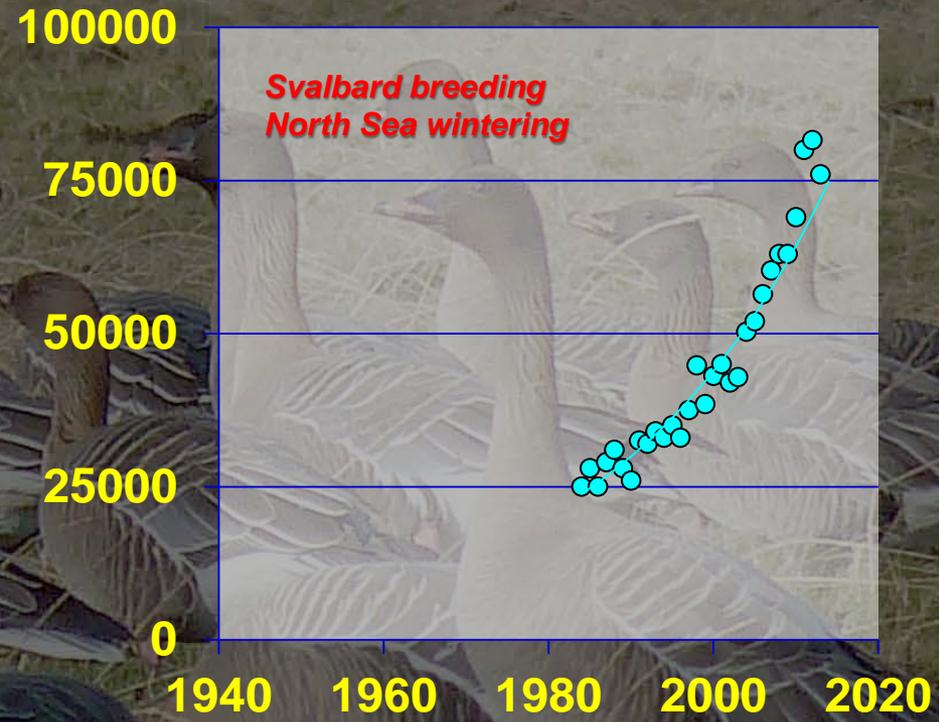
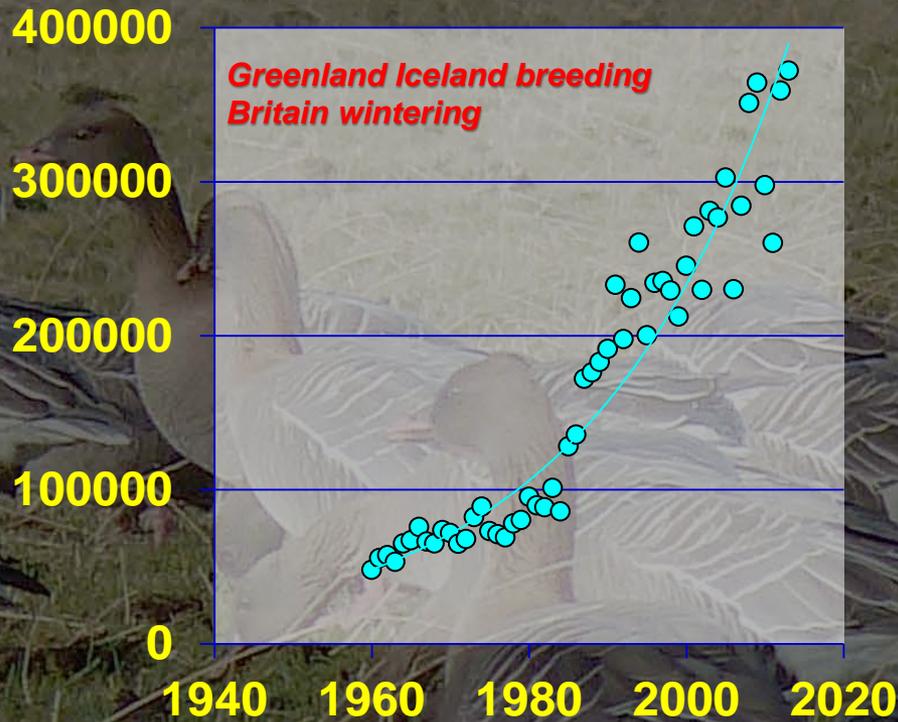
Data courtesy of Leif Nilsson  
(Lund University, Sweden)

# White-fronted Goose *Anser albifrons albifrons*



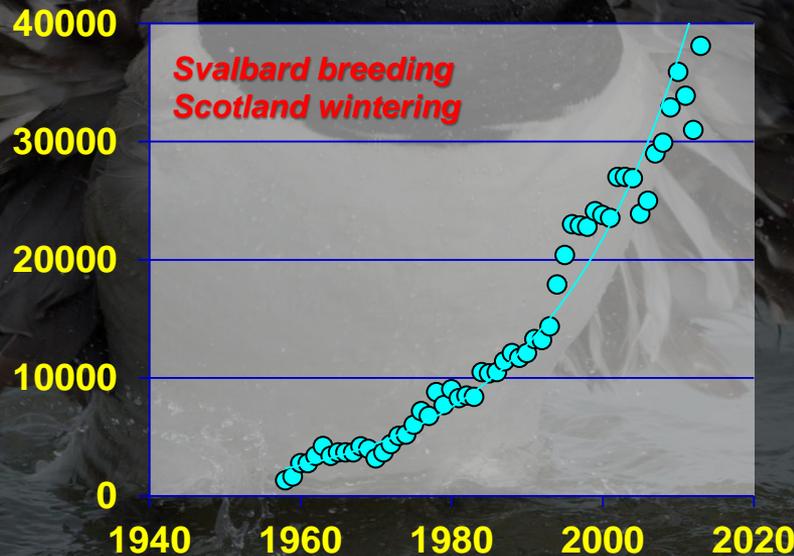
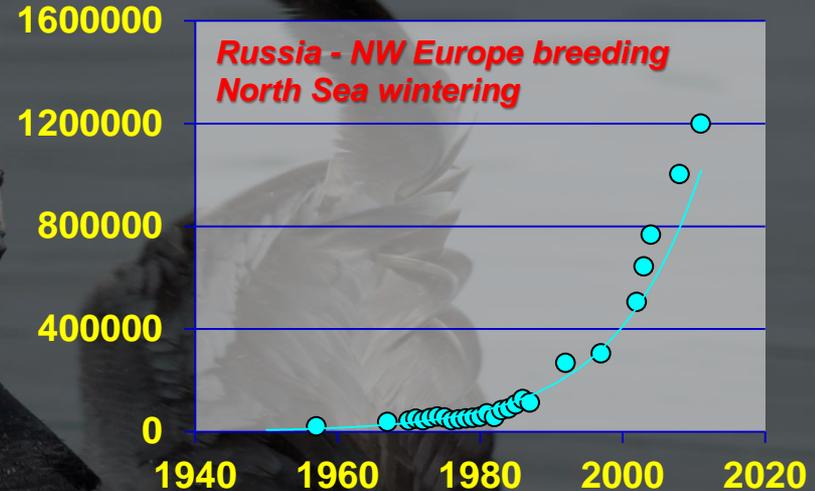
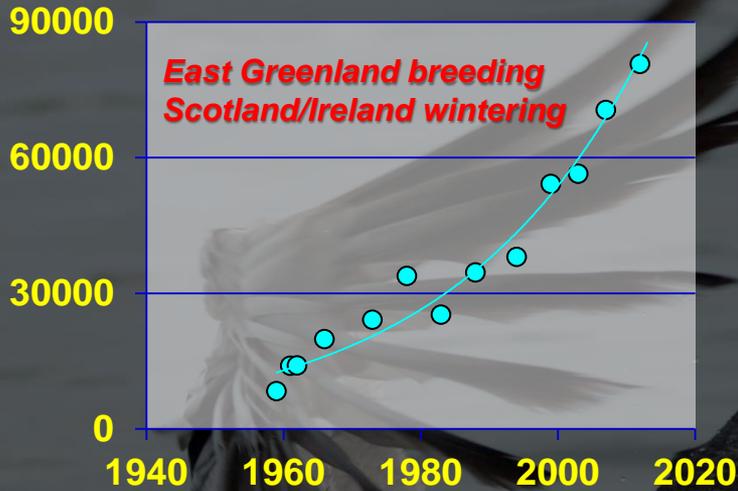
Data courtesy of Barwolt S. Ebbinge, (Alterra, The Netherlands), Kees Koffijberg (Sovon, The Netherlands), blue dots represent actual counts, red lines estimates to account for missing counts with 95% confidence intervals

# Pink-footed Goose *Anser brachyrhynchus*



Data courtesy of Jesper Madsen (Aarhus University) and Carl Mitchell (WWT United Kingdom)

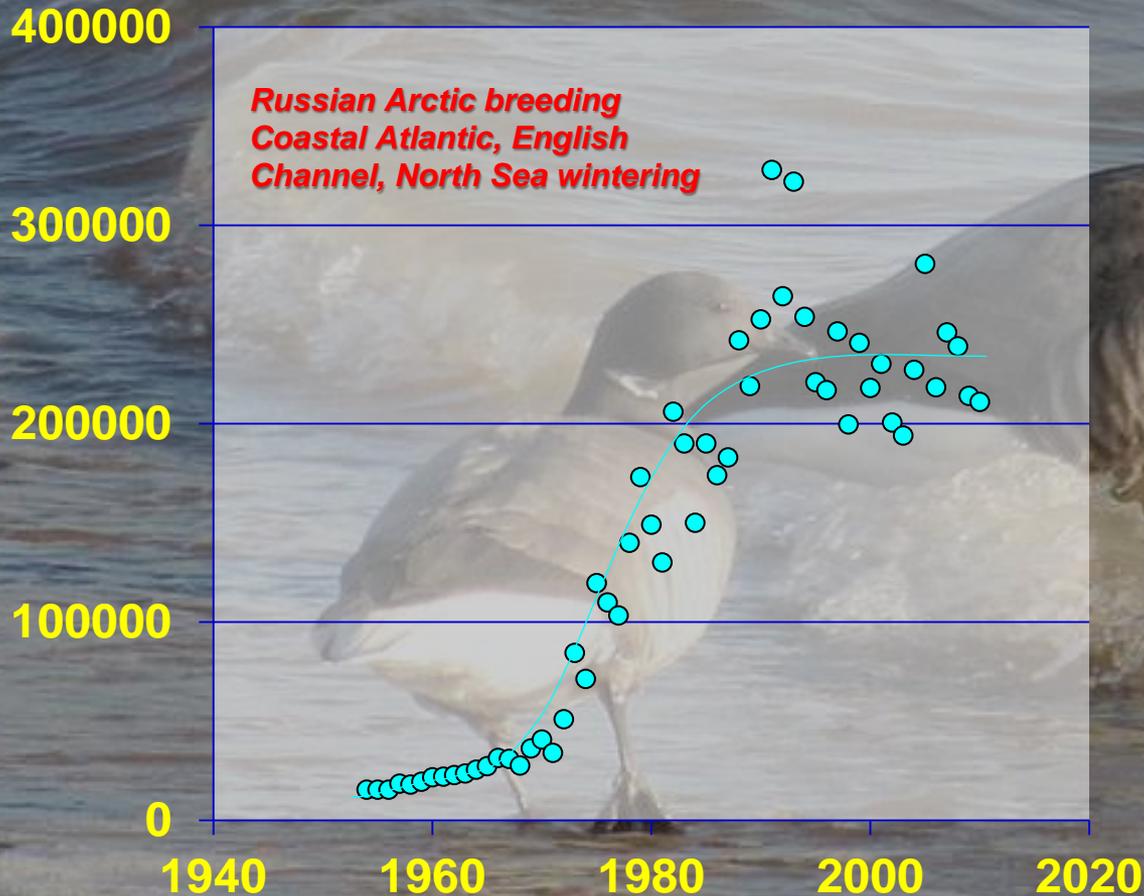
# Barnacle Goose *Branta leucopsis*



Data courtesy of Carl Mitchell and Larry Griffin (WWT, United Kingdom), Alyn Walsh (National Parks & Wildlife Service, Ireland), Barwolt S. Ebbinge, (Alterra, The Netherlands), Kees Koffijberg (Socon, The Netherlands)

# Dark-bellied Brent Goose

## *Branta bernicla bernicla*



Data courtesy of Barwolt S. Ebbinge,  
(Alterra, The Netherlands), Kees Koffijberg  
(Sovon, The Netherlands)

# BEWARE: NOT ALL POPULATIONS THRIVE

TECHNICAL SERIES No. 36



International Single Species Action Plan  
for the Conservation of the  
Lesser White-fronted Goose  
(Western Palearctic Population)

*Anser erythropus*



TECHNICAL SERIES No. 56

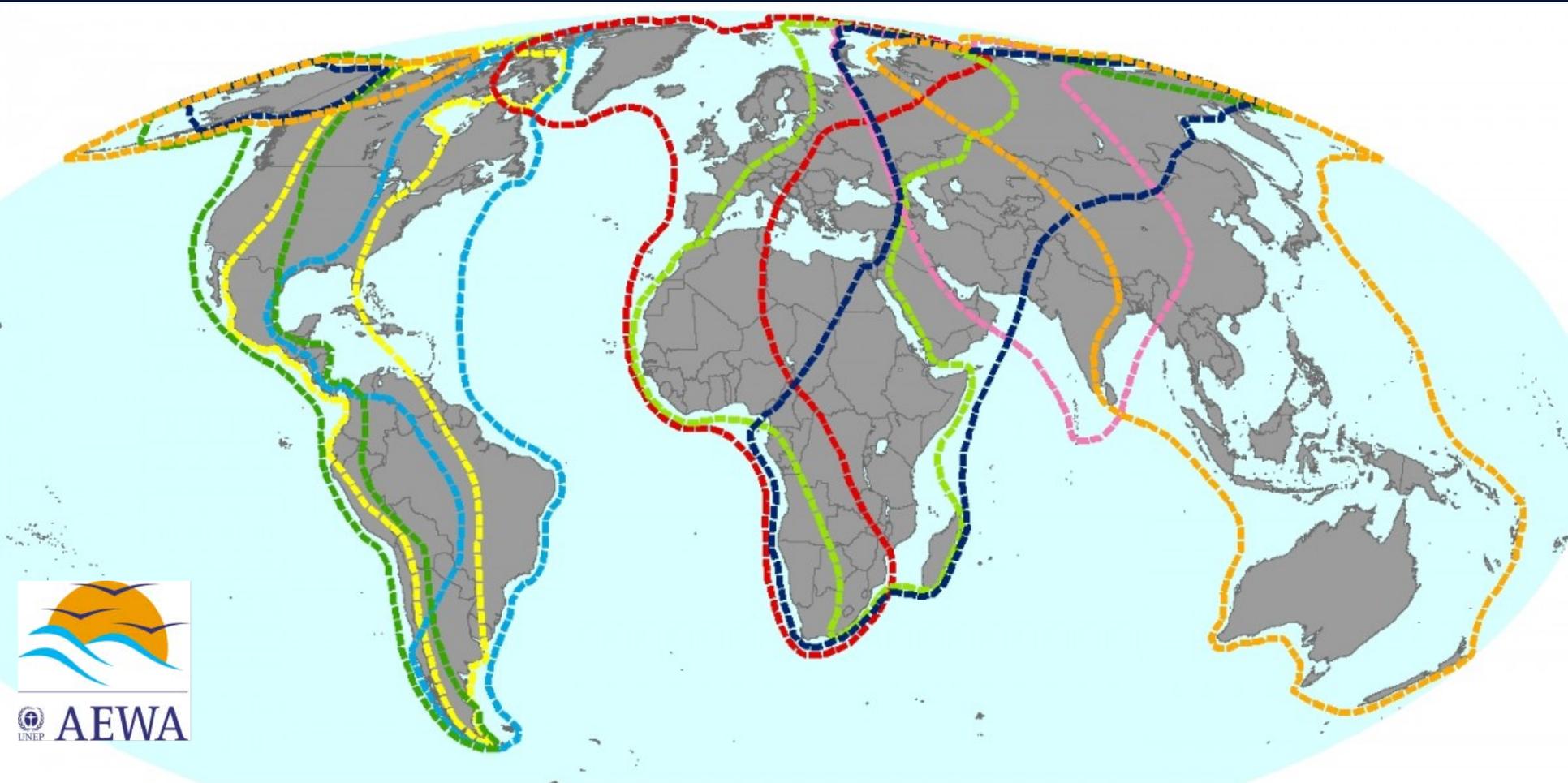


International Single Species Action Plan  
for the Conservation of the  
Taiga Bean Goose

*Anser fabalis fabalis*



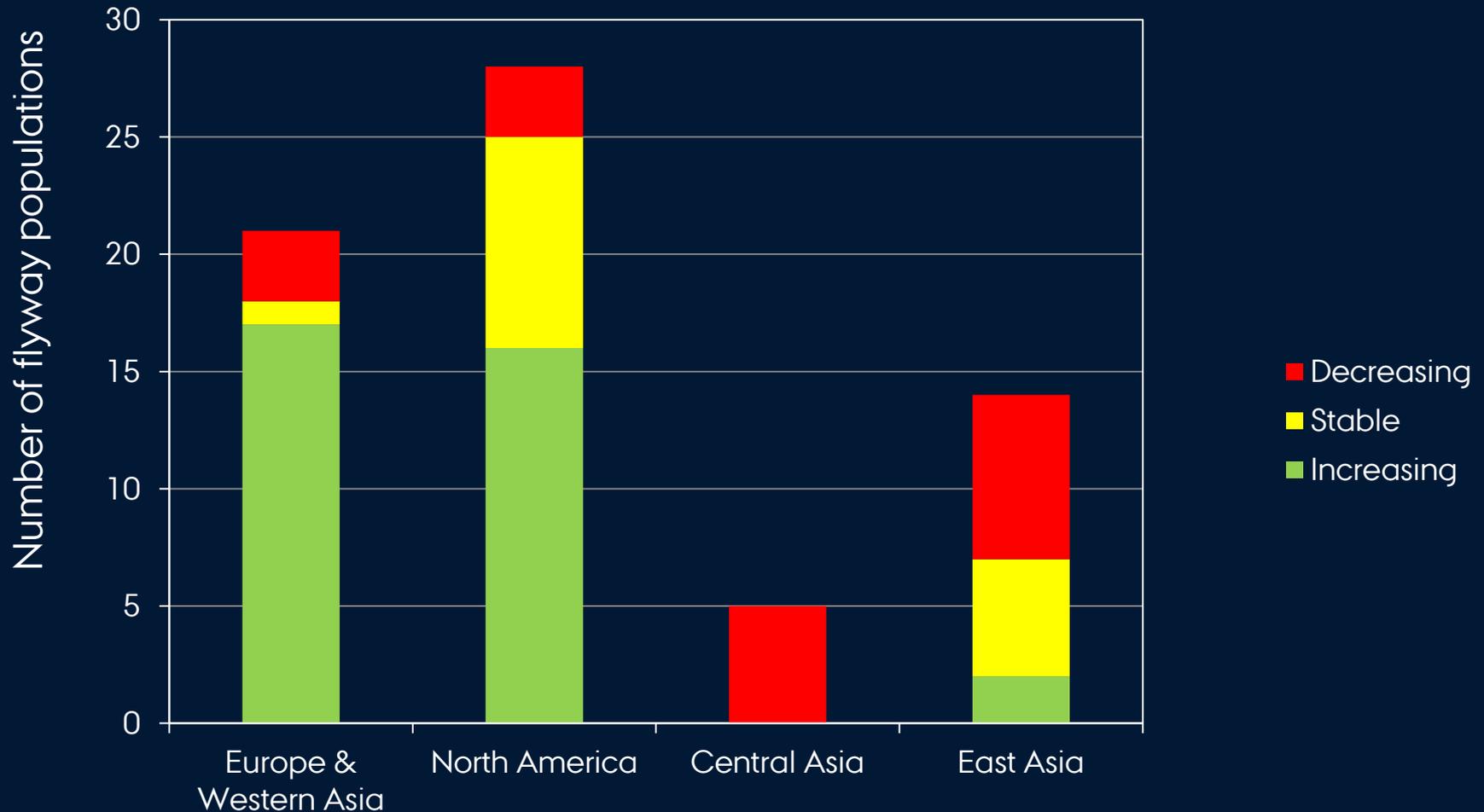
# GLOBAL WATERBIRD FLYWAYS



UNEP AEW A

- |  |                  |   |                   |   |                         |   |                       |
|--|------------------|---|-------------------|---|-------------------------|---|-----------------------|
|  | Pacific Americas |  | Atlantic Americas |  | Black Sea/Mediterranean |  | Central Asia          |
|  | Central Americas |  | East Atlantic     |  | East Asia/East Africa   |  | East Asia/Australasia |

# STATUS OF THE NORTH HEMISPHERE GOOSE FLYWAY POPULATIONS



Source: Fox, A.D. and Leafloor, J.O. (2017)

*A Global Audit of the Status and Trends of Arctic and Northern Hemisphere Goose Populations.*

Conservation of Arctic Flora and Fauna: Akureyri, Iceland

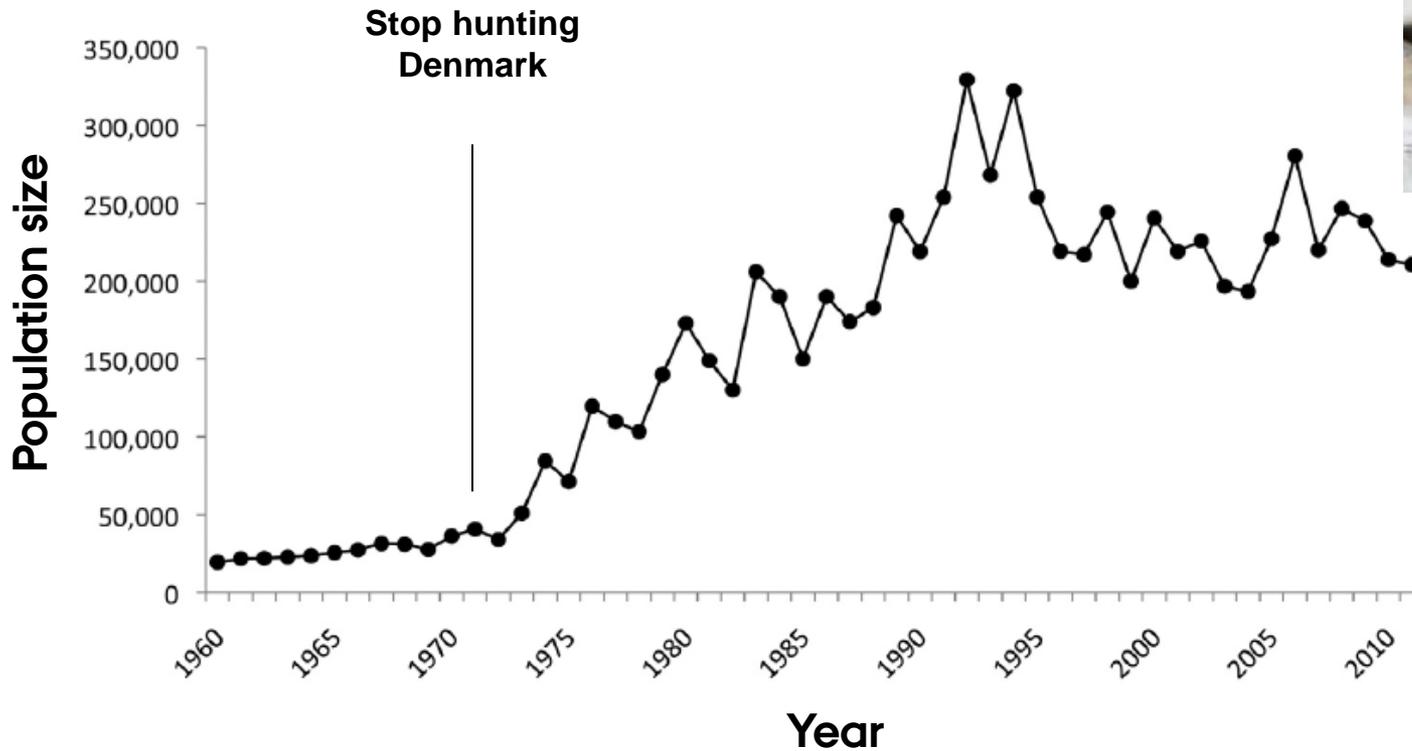


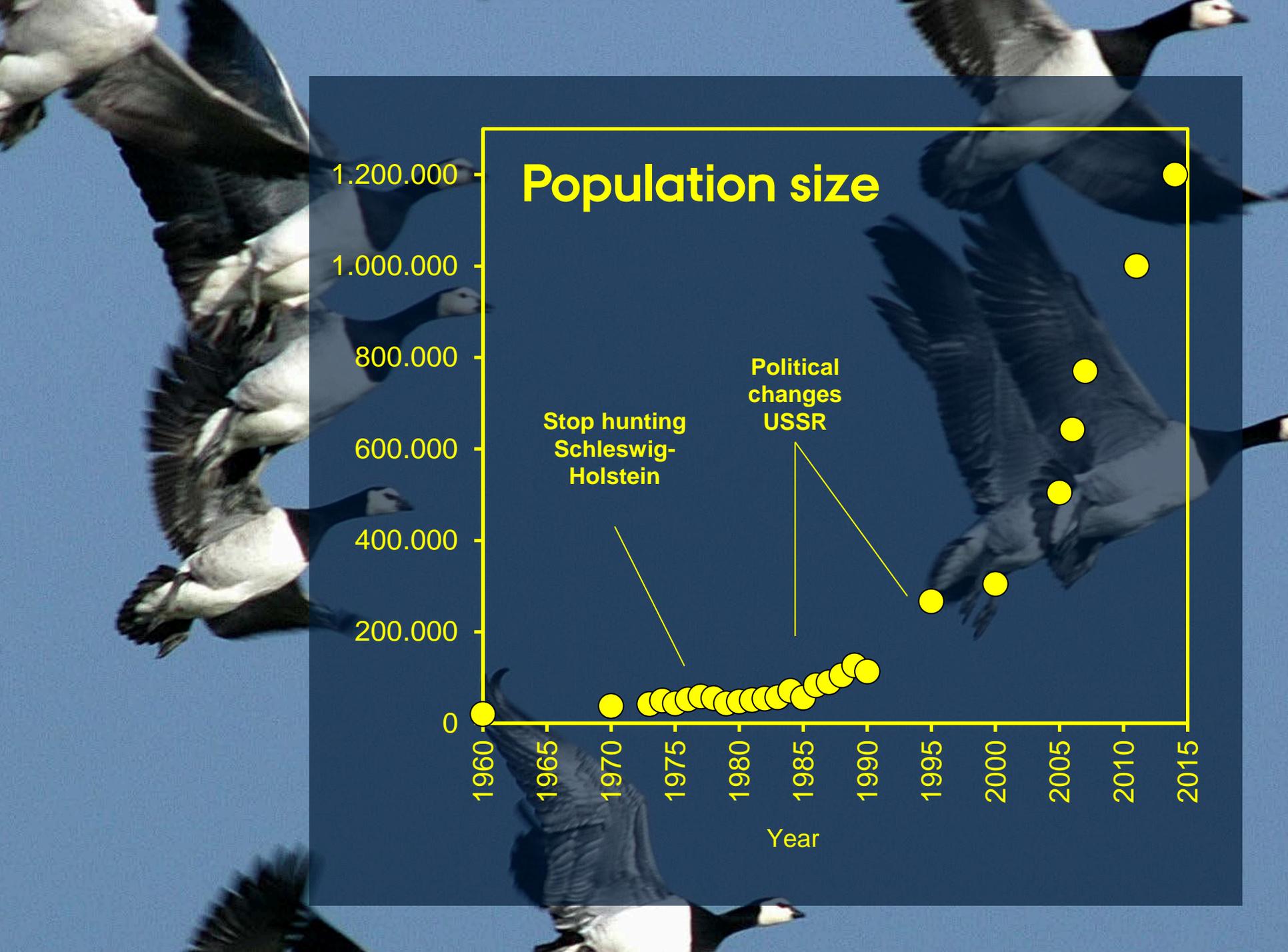
# ROLE OF HUMAN PERSECUTION



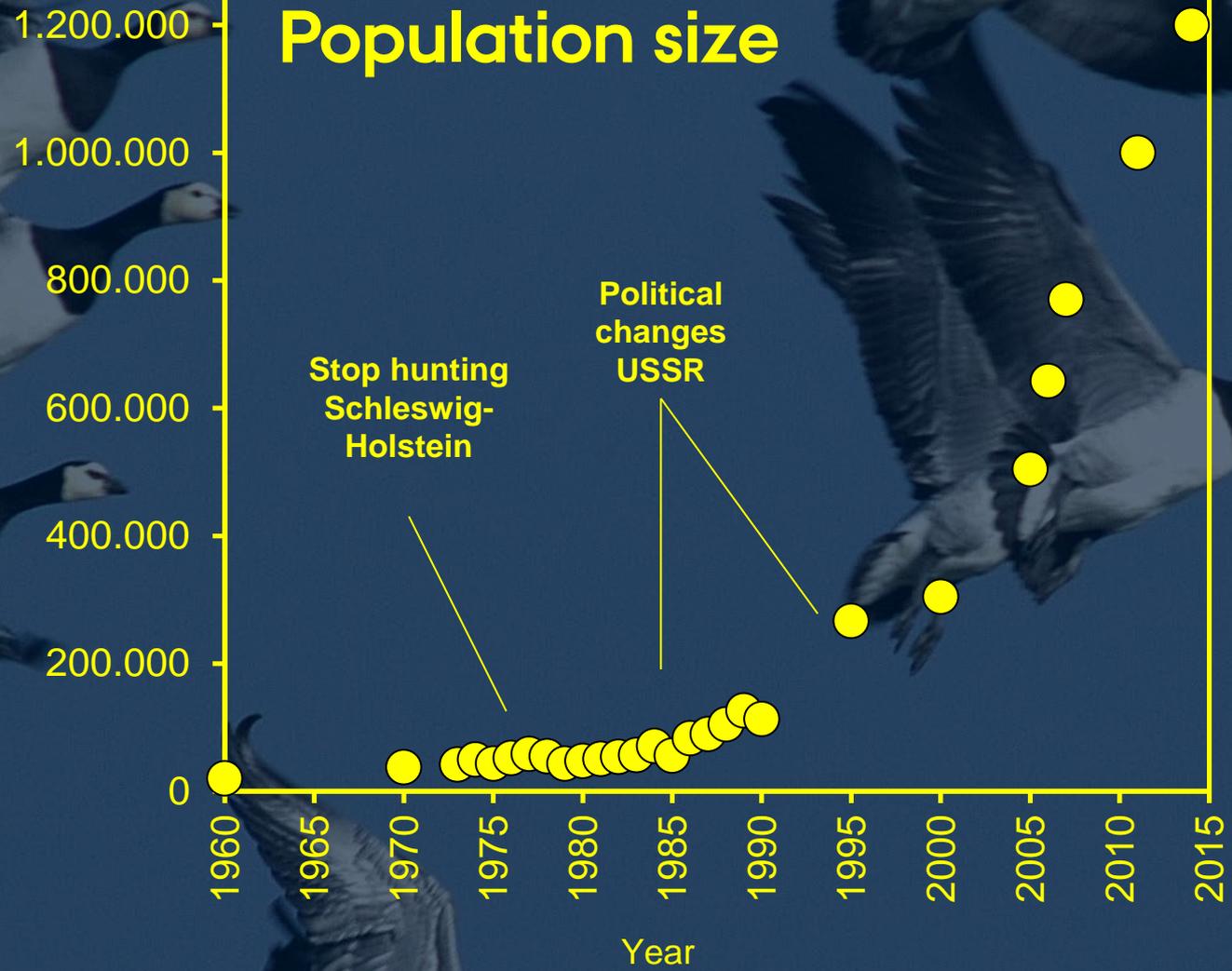
# GEESE: A SUCCESS STORY FOR NATURE CONSERVATION IN EUROPE

## EXAMPLE: DARK-BELLIED BRENT





# Population size



Stop hunting  
Schleswig-  
Holstein

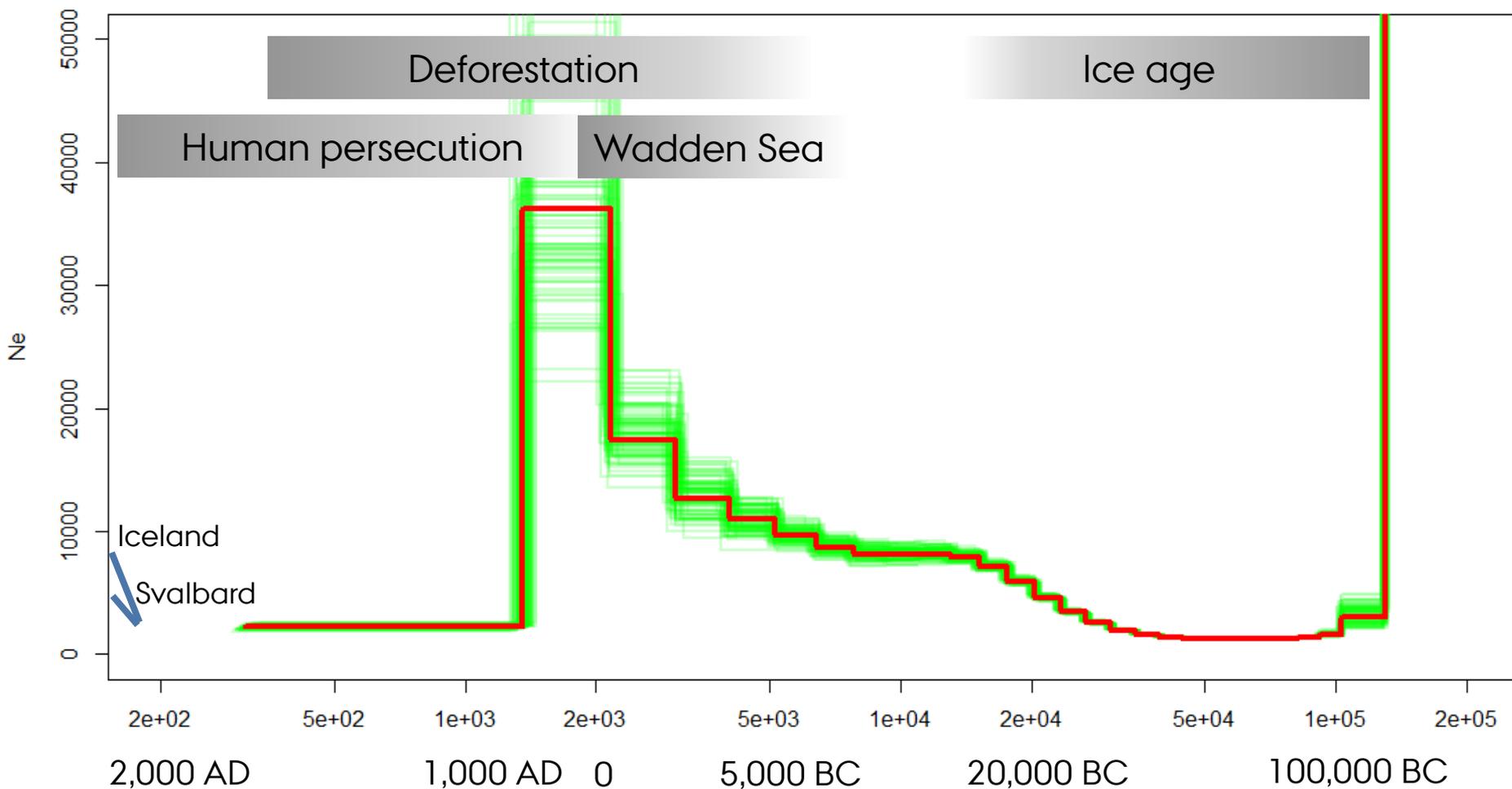
Political  
changes  
USSR

Year

# RECONSTRUCTING THE DEMOGRAPHIC HISTORY OF THE PINK-FOOTED GOOSE

Source: Pujolar, Hansen, Lovén & Madsen (paper in review)

Effective population size ( $N_e$ )





Stone corral for catching  
flightless geese,  
Þjórsárver, Iceland

Photo: Gunnlaugur Juliusson



Source: Storå, N. (1968) Mass capture of waterfowl in Northern Eurasia. Åbo Akademi, Åbo

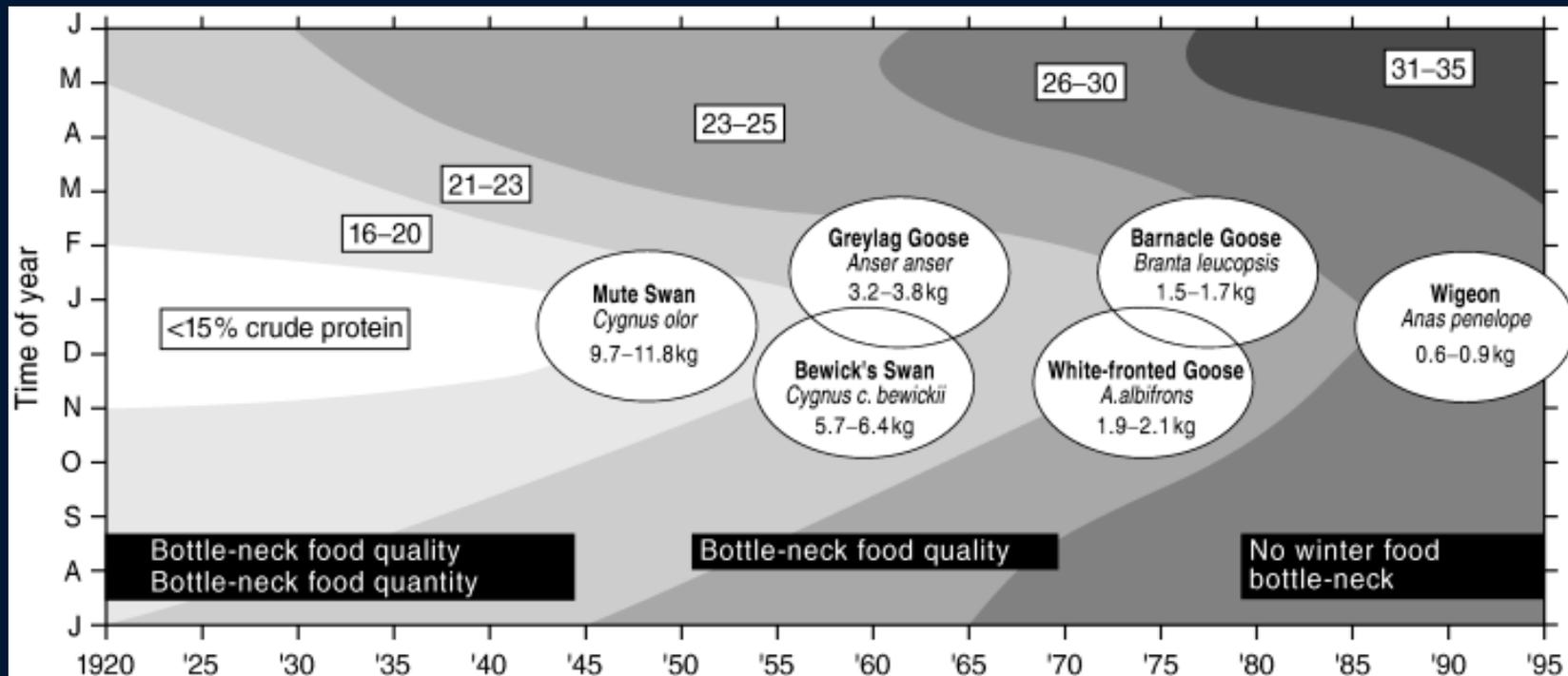




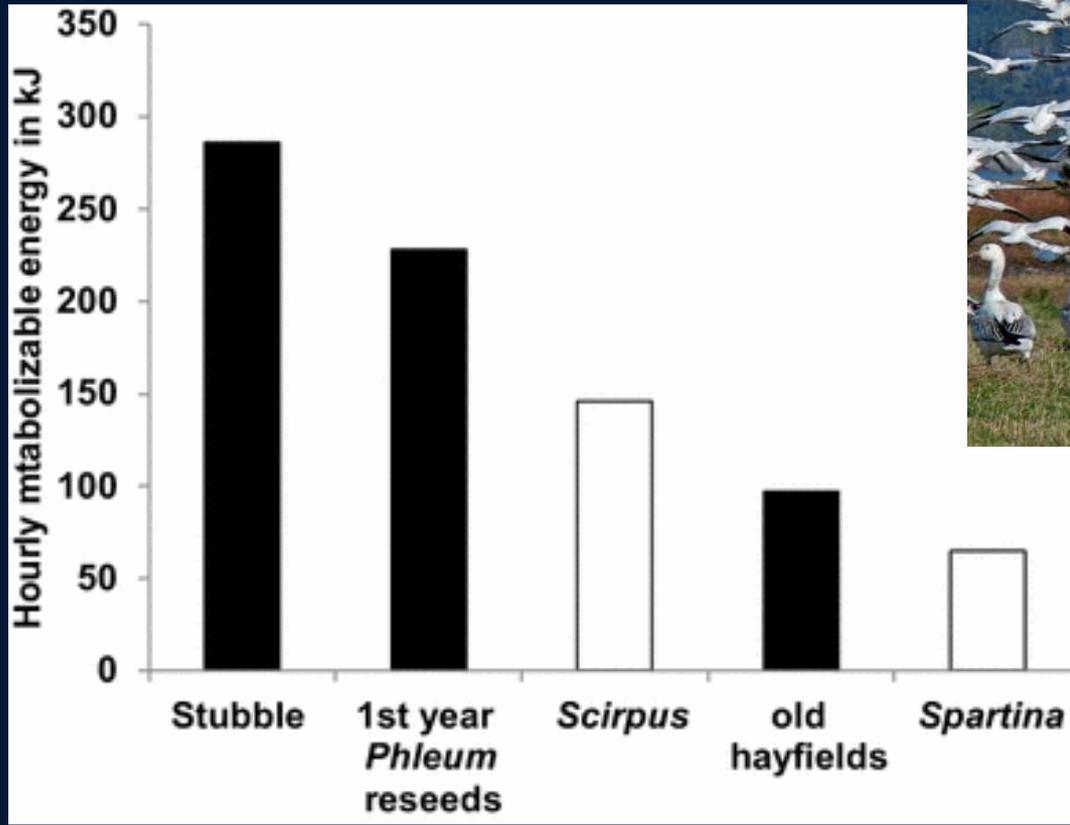
# IMPACTS OF MODERN AGRICULTURE

# CHANGES IN FOOD QUALITY

## GRASSLANDS ON DAIRY FARMS IN THE NETHERLANDS 1920-1995

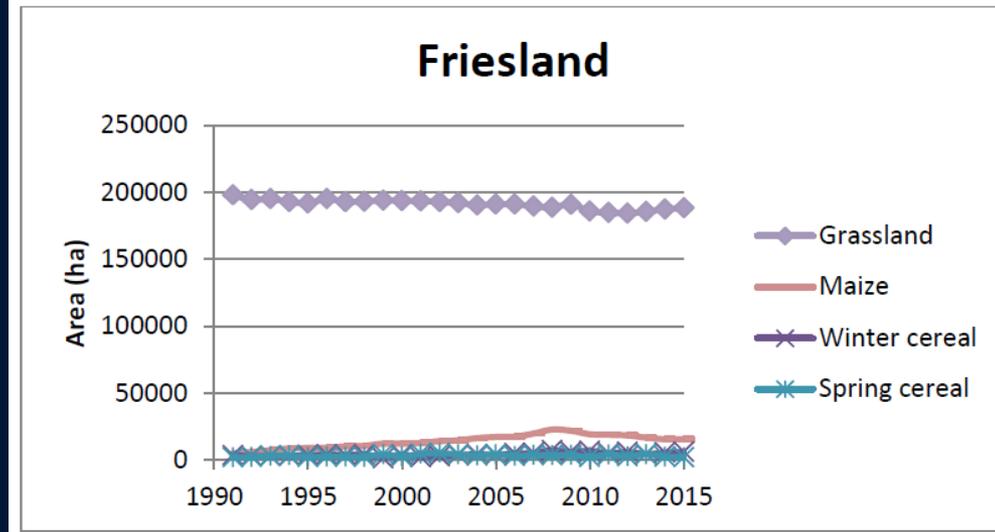
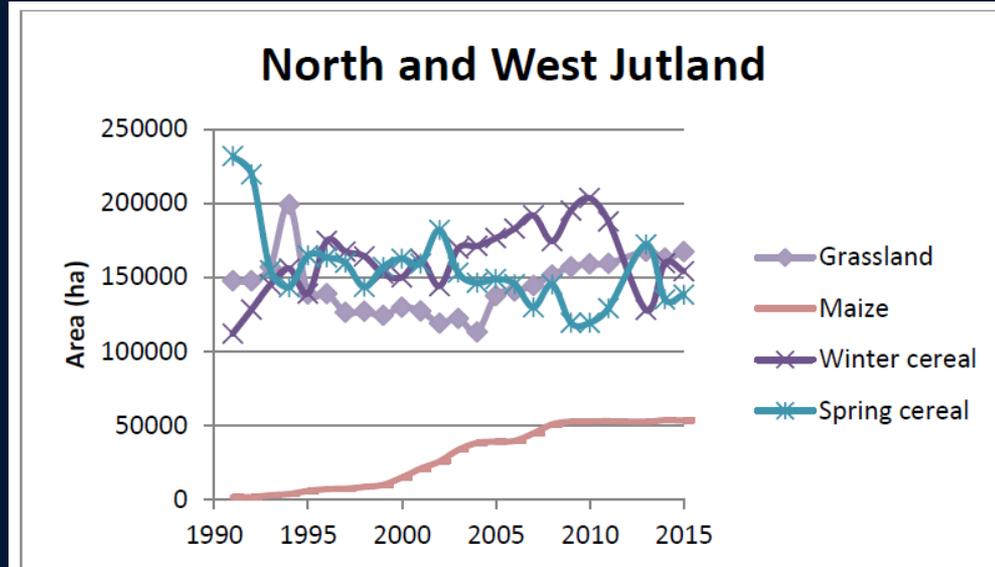


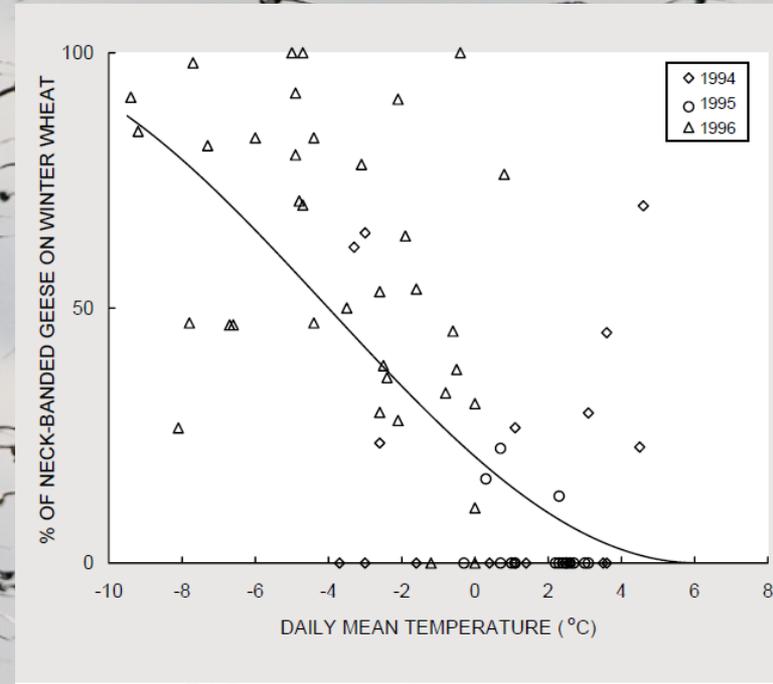
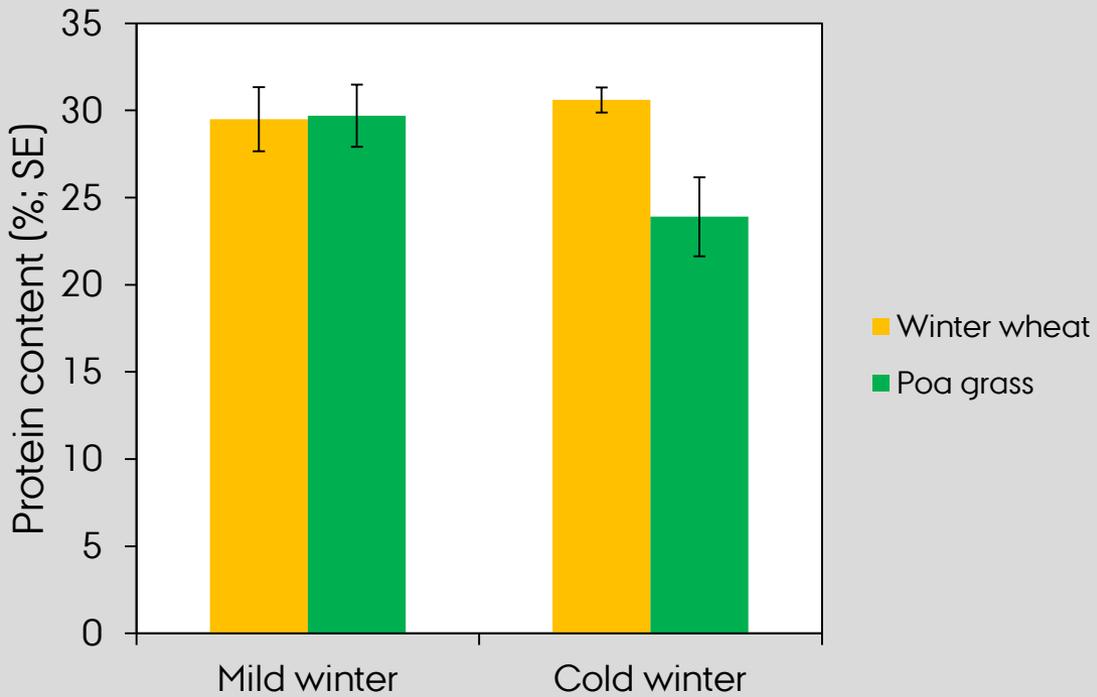
# AGRICULTURAL FOOD OFFERS HIGHER INTAKE RATES



Source: Bechét et al. (2004); Journal of Applied Ecology;

# AGRICULTURAL LAND USE CHANGE





Source: Therkildsen & Madsen (2000); Wildlife Biology





1954

# STRUCTURAL CHANGES

Example: west Jutland, Denmark  
Source: [www.krak.dk](http://www.krak.dk)

2014



# GEESE ADAPT



# Barnacle Goose

## Russian/Germany- NL population

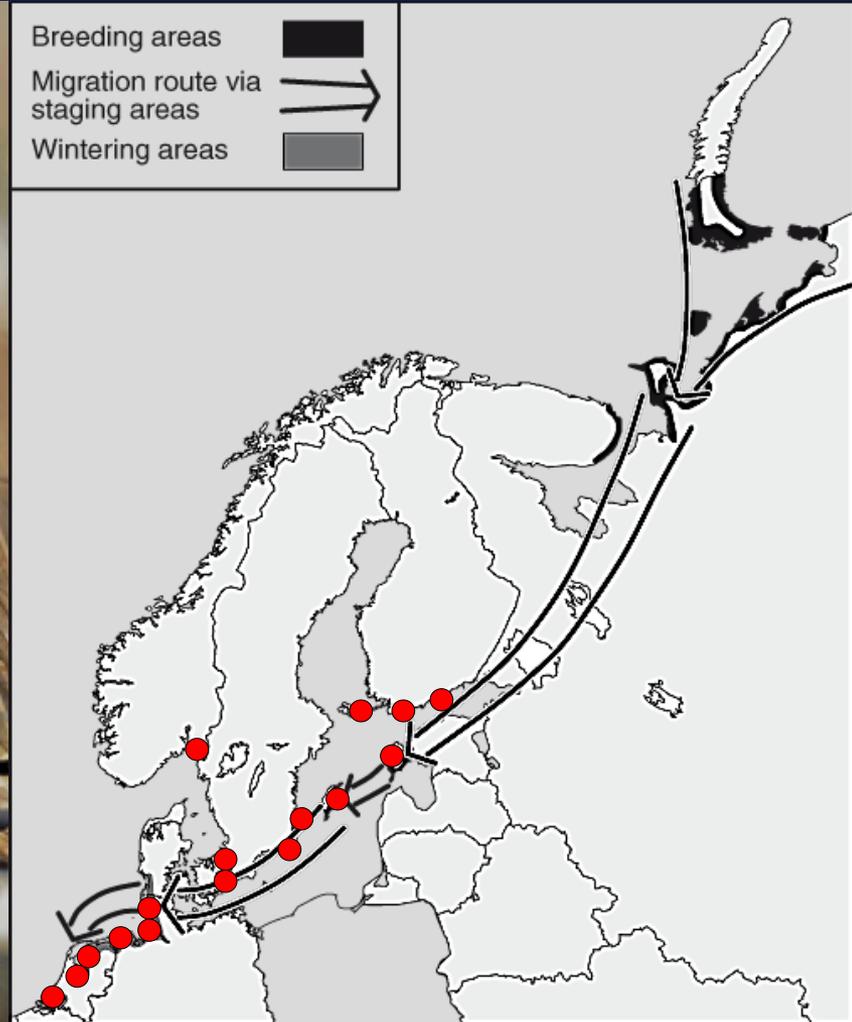
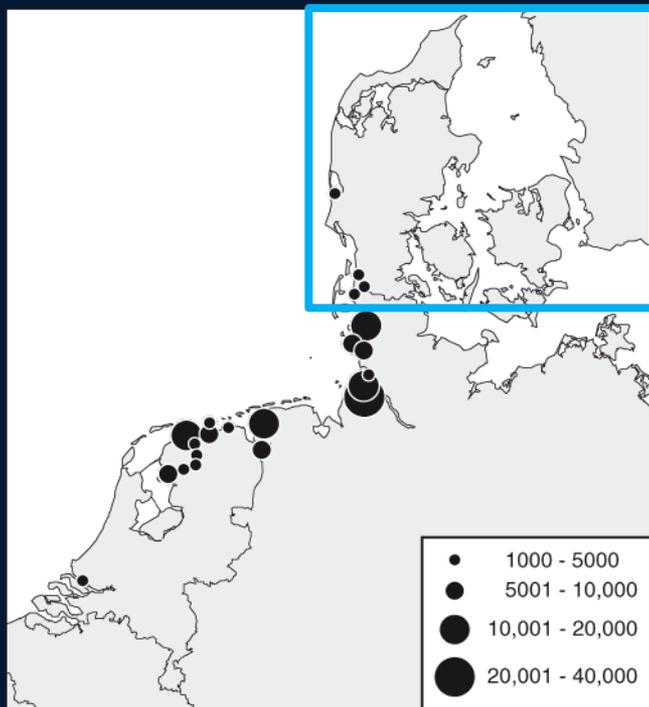




Foto: E. Psott

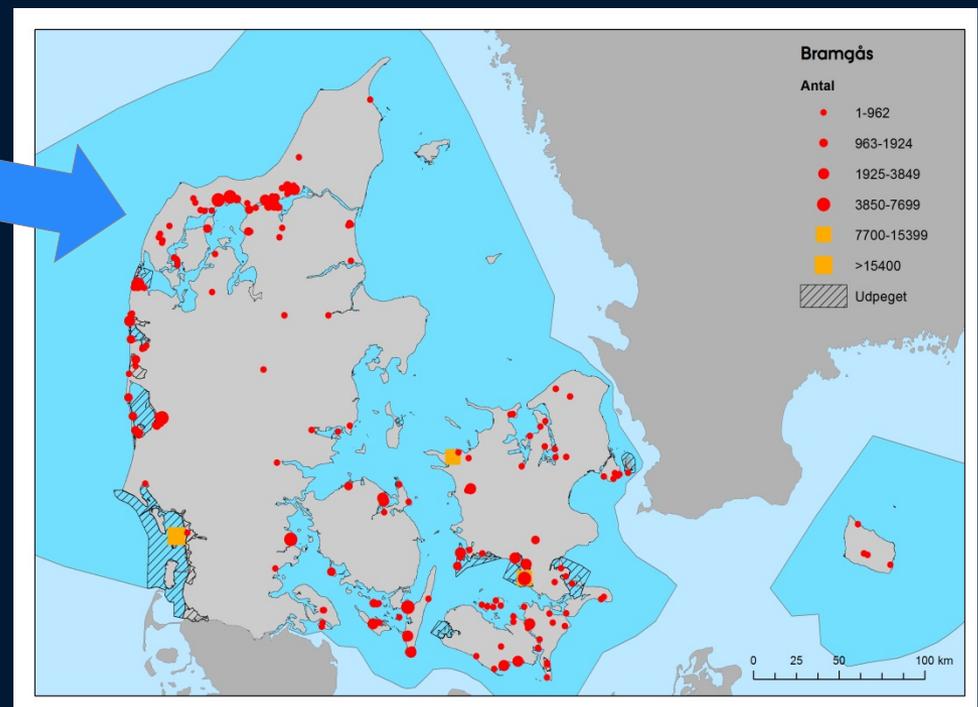
# BARNACLE GOOSE DISTRIBUTION

March  
Mid 1990s



Source: Goose Populations of the Western Palearctic (1999)

March  
2015



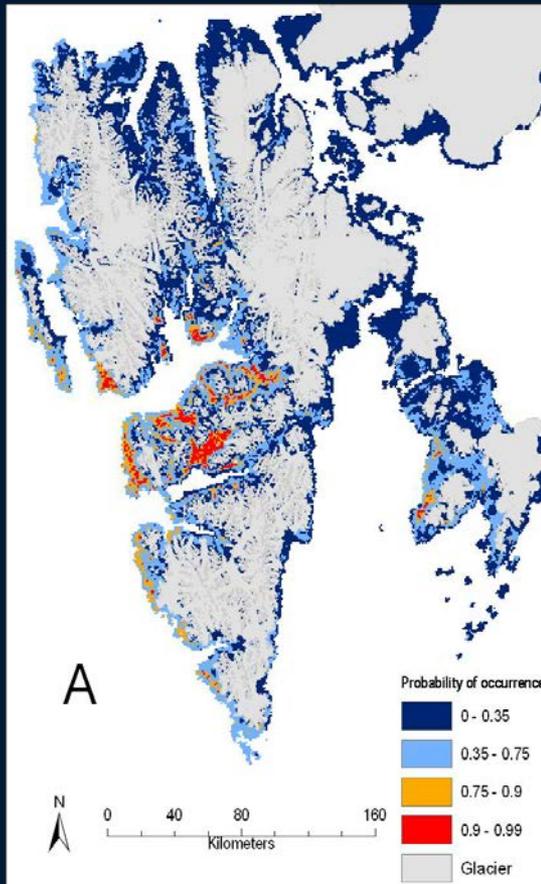
Source: Danish Nature Monitoring Programme NOVANA

# CLIMATE CHANGE IMPACTS: NO STRAIGHTFORWARD ANSWER

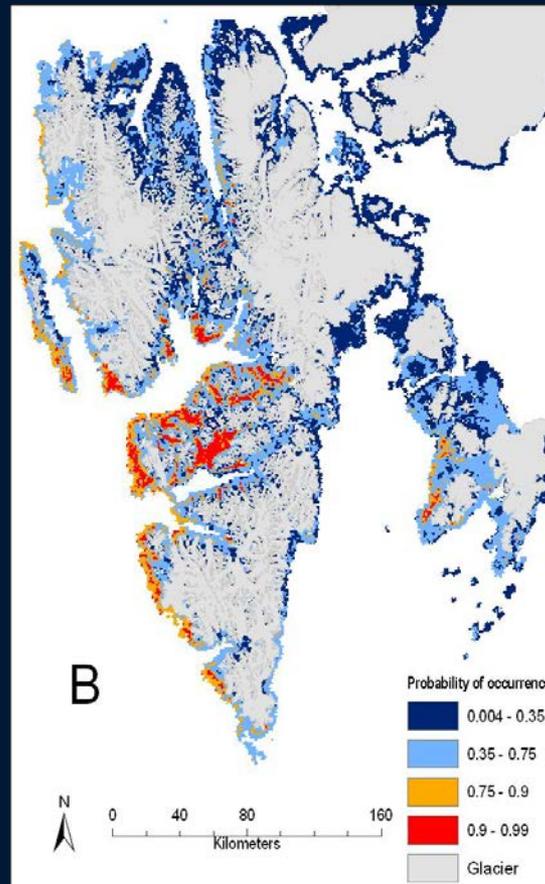


# PREDICTED NEST DISTRIBUTION SUITABILITY FOR PINK-FOOTED GEESE IN SVALBARD

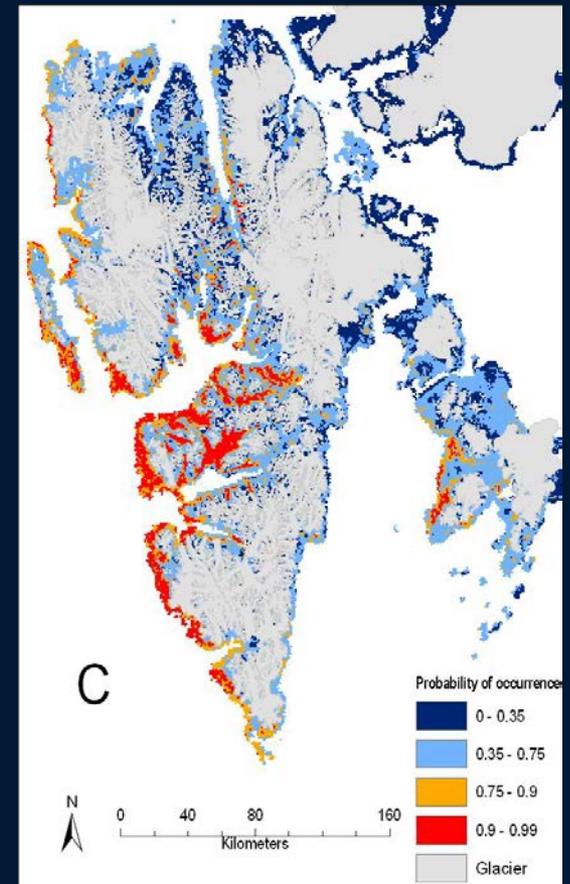
Source: Jensen, Madsen & Wisz (2008) Global Change Biology



Present (2000)



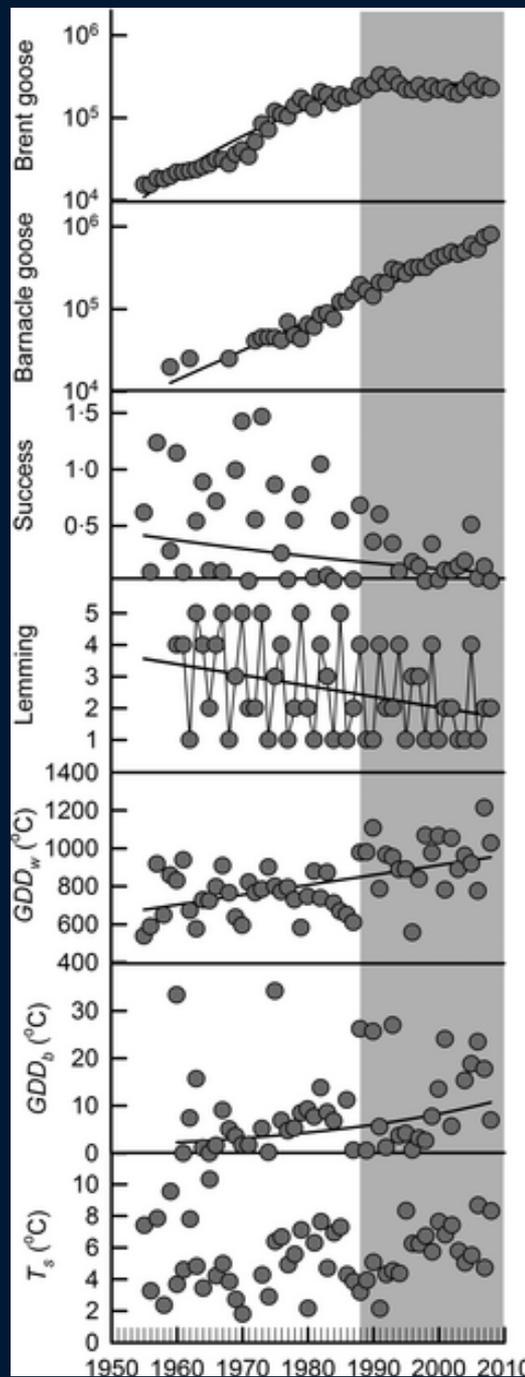
1°C temp. increase  
scenario



2°C temp. increase  
scenario

# CASCADING EFFECTS OF FALTERING LEMMING CYCLES IN THE ARCTIC





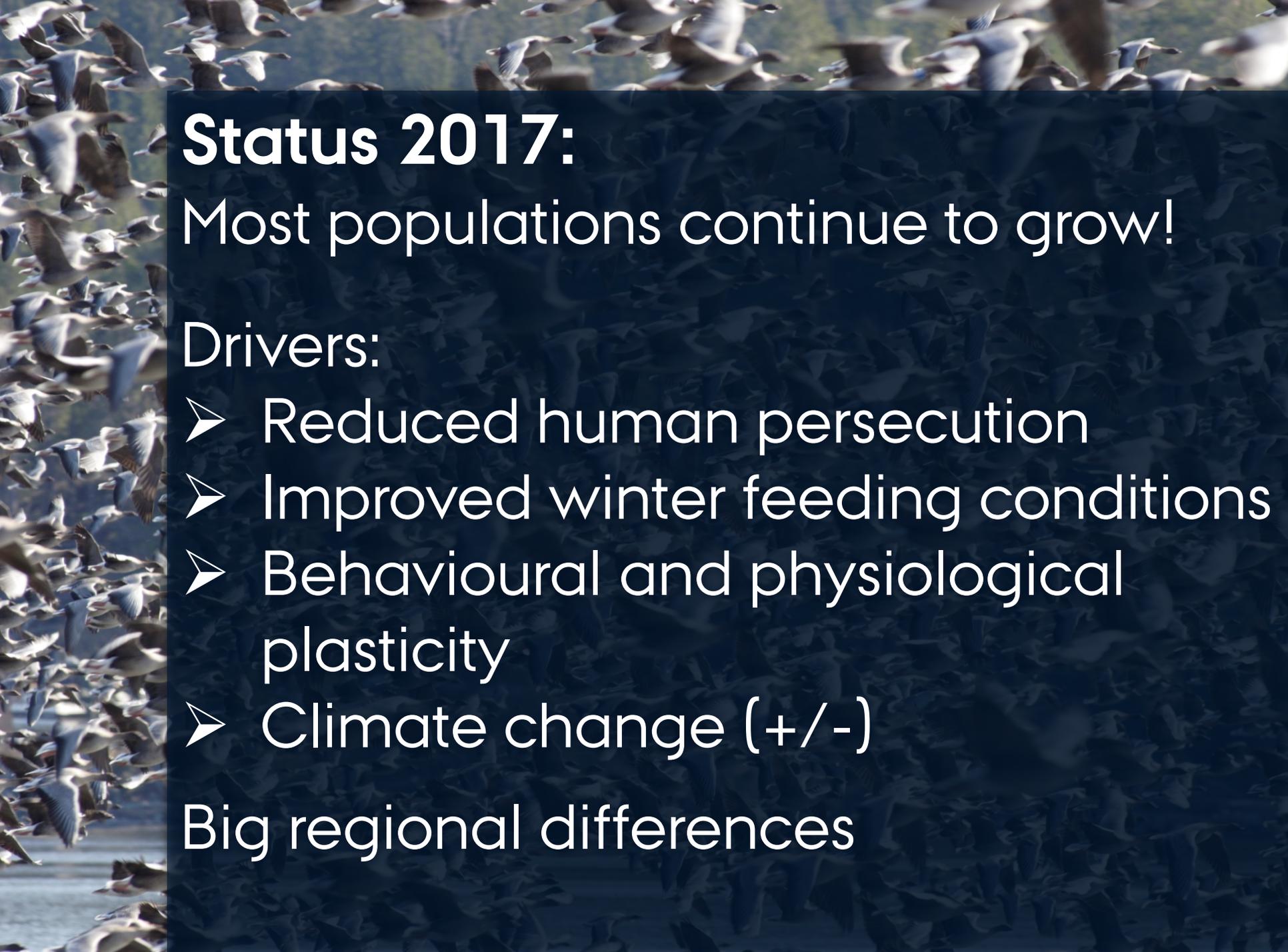
Source: Nolet et al. (2013);  
Journal of Animal Ecology



© Jouke Prop



Photos: Espen Bergersen

A large flock of birds, likely geese or swans, is shown in flight over a body of water. The birds are densely packed, filling the upper and middle portions of the frame. The background is a soft, out-of-focus landscape with greenery and a blue sky. The overall scene conveys a sense of natural abundance and movement.

## Status 2017:

Most populations continue to grow!

Drivers:

- Reduced human persecution
- Improved winter feeding conditions
- Behavioural and physiological plasticity
- Climate change (+/-)

Big regional differences



Thanks for your attention!