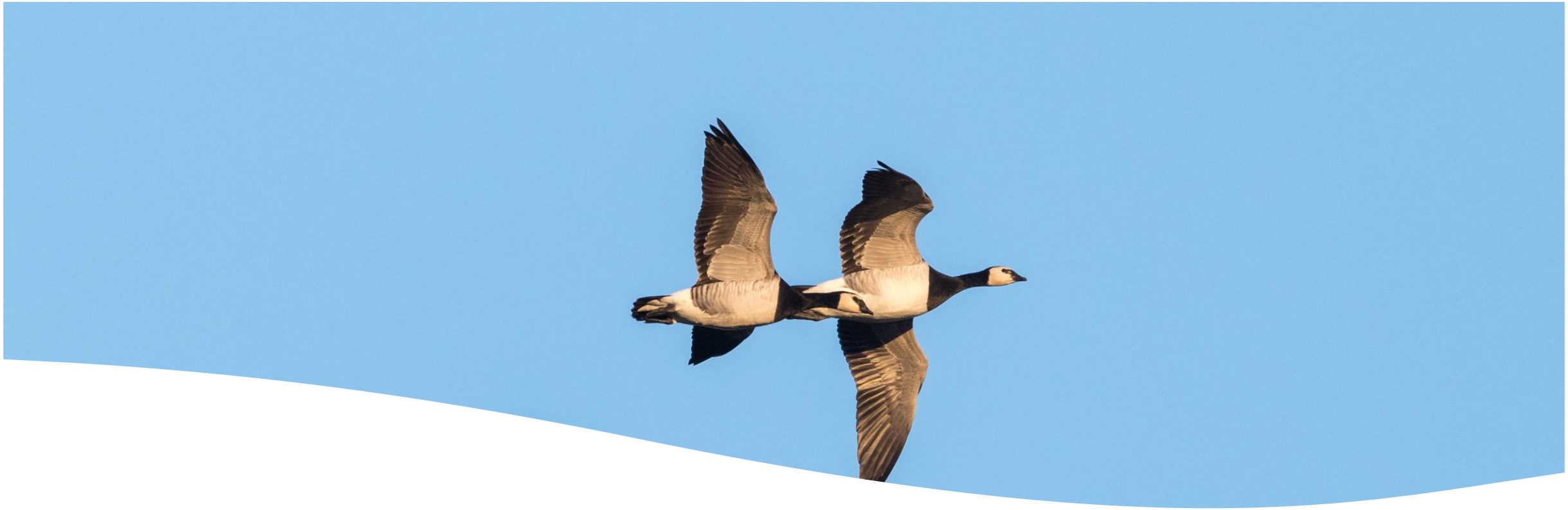

Barnacle Goose Session

AEWA/EGMIWG/5.17 + AEWA/EGMIWG/5.18 [annex 3]

Sovon, Kees Koffijberg

Doc EGMIWG/5.17 + AEWA/EGMIWG/5.18

Barnacle Goose Russia/Germany & Netherlands population status report and population IPM

- **Population status report 1980-2018**

Kees Koffijberg, Erik van Winden, Preben Clausen, Rasmus Due Nielsen, Koen Devos, Fredrik Haas, Leif Nilsson, Kjell Isaksen, Henning Hjeldberg, Jesper Madsen, Teemu Lehtinimie, Tero Toivanen, Ingunn Tombre & Johannes Wahl (EGMP Data Centre & Sovon Vogelonderzoek Nederland)

- **Development of an Integrated Population Model for Barnacle Geese of the Russian Management Unit (MU1)**

Hans Baveco, Paul W. Goedhart, Kees Koffijberg, Henk van der Jeugd, Lisenka de Vries, Ralph Buij & Bart A. Nolet (Wageningen Environmental Research, Wageningen Plant Research/Biometris, Sovon Vogelonderzoek Nederland, Netherlands Institute of Ecology, Dutch Centre for Avian Migration and Demography, in collaboration with the EGMP Data Centre)

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Just to remind…

MU 1: Russian breeding population (migratory)

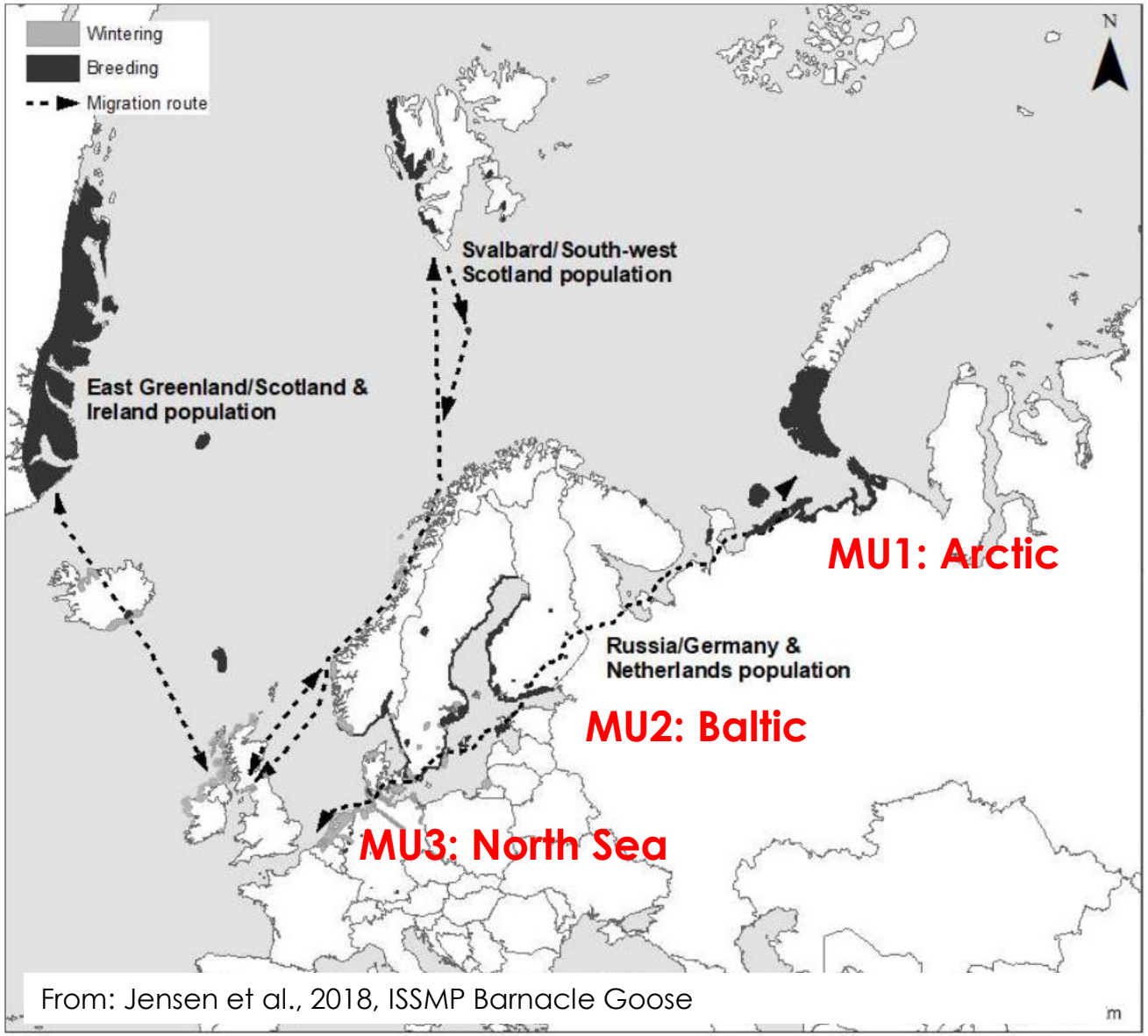
Arctic-Russia

MU 2: Baltic breeding population (migratory)

Finland, Sweden, Denmark, Estonia, Russian Baltic, Norway (Oslofjord region)

MU 3: North Sea breeding population (mainly sedentary)

The Netherlands, Germany, Belgium, SW-Denmark



From: Jensen et al., 2018, ISSMP Barnacle Goose

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Population status at flyway level

- January goose counts, derived from national census schemes (high coverage, missing data Germany 2017-2018 interpolated from previous years)
- Flyway population estimate 1.3 to 1.4 million individuals in 2017-2018
- Wintering range represented by NL (58%), DE (25%), DK (13%), SE (3%), BE (1%)

Country	**2017**	**2018**
Belgium	9,406	13,715
The Netherlands	791,337	729,667
Germany	338,624	332,443
Denmark	164,688	176,785
Sweden	22,934	50,158
Total flyway (winter)	1,326,989	1,302,768

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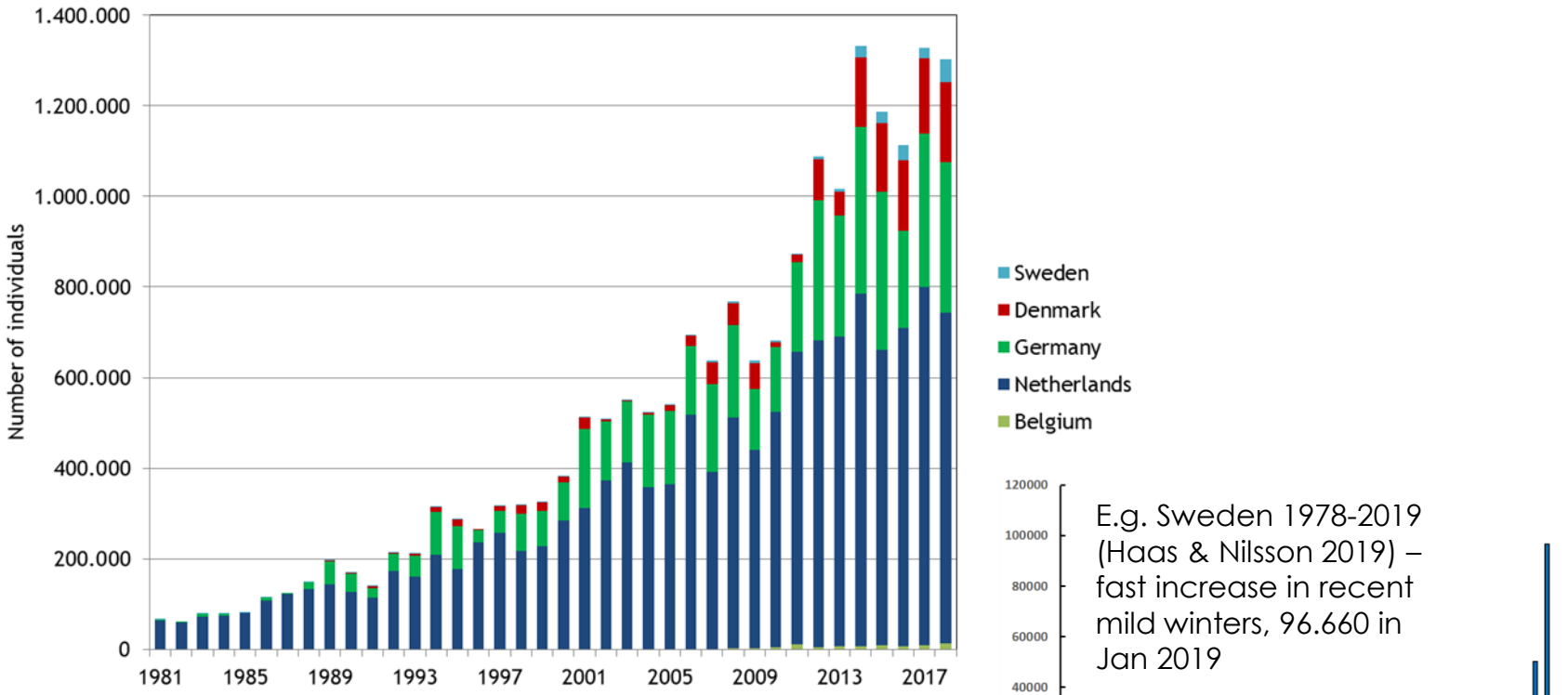
Long-term trend flyway level

- 9% increase per annum since 1981
- Recently signs of stabilisation
- Initially mainly in NL, but Germany (1990s), Denmark and Sweden (2010s) taking larger share, as a result of NE-expansion of wintering range (see panel to the right). Belgium only takes a tiny part of the wintering population



E.g. Sweden 1978-2019 (Haas & Nilsson 2019) – fast increase in recent mild winters, 96.660 in Jan 2019

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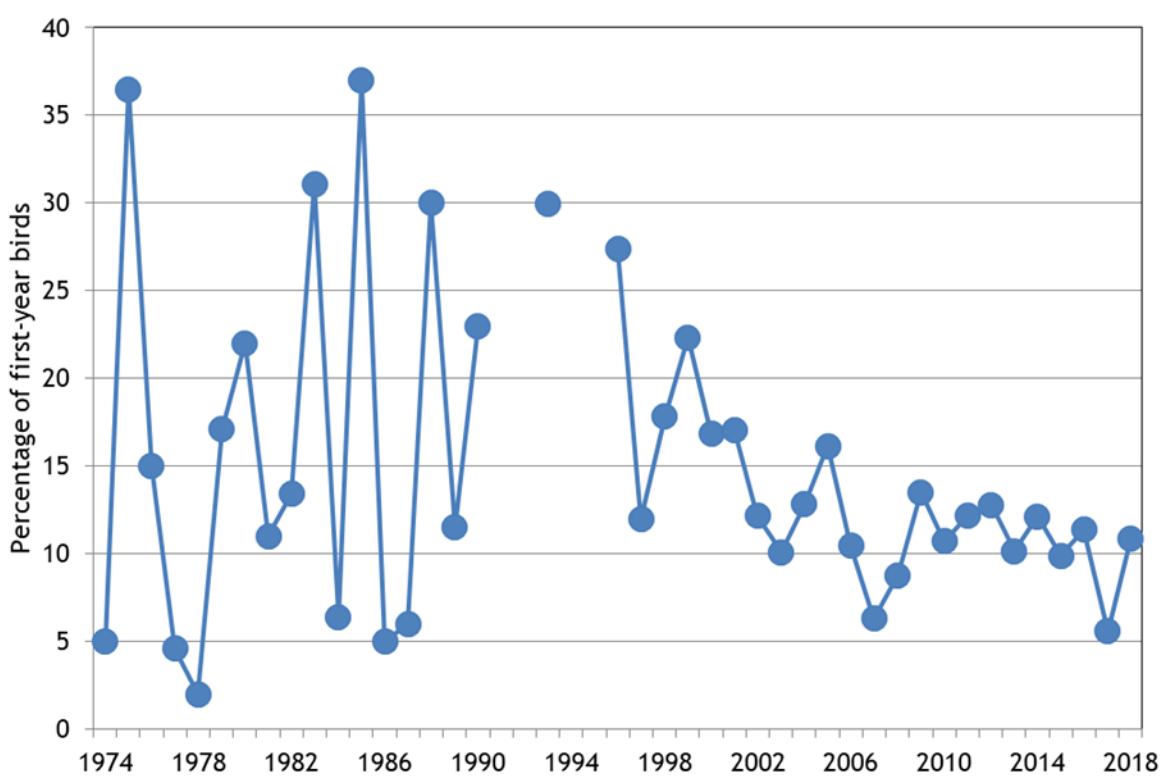
Productivity

- Long-term data for Netherlands, collected by a small group of trained volunteers
- Reflecting productivity mainly for MU 1, expressed as % first-year birds in flocks Oct-Jan
- Productivity has gone done and amplitude between "good" and "poor" breeding years nowadays much smaller, as observed in several arctic-breeding goose species from Russia



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Population status at MU level (summer)

- Derived from dedicated counts in July – early September (individuals not breeding pairs!)
- Similar routines as winter counts
- Only to some extent available in MUs 2 and 3

	Number	Year of census and coverage
MU2: Baltic		
Finland	**33,707**	2019
Denmark	**15,942**	2018, perhaps incl. moulting birds SE
Norway (Oslofjord)	**(1,777)**	2019, no full coverage
MU3: North Sea		
Belgium (Flanders)	**535**	2018
The Netherlands	**61,999**	2018
Germany-Northrhine Westphalia	**603**	2018
Germany-Niedersachsen	**(238)**	2018, no full coverage

> 51.500 (Sweden missing!)

~ 65.000 - 70.000 (including Schleswig-Holstein/DE & SW-Denmark)

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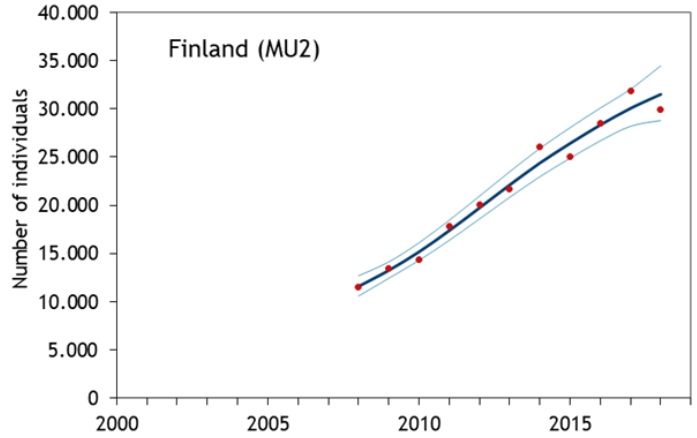
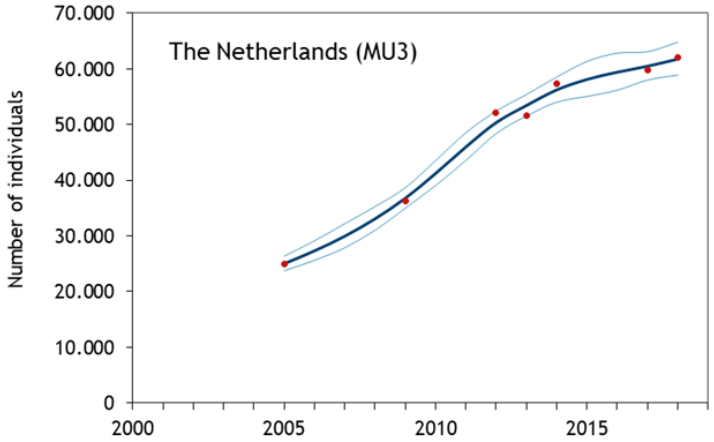
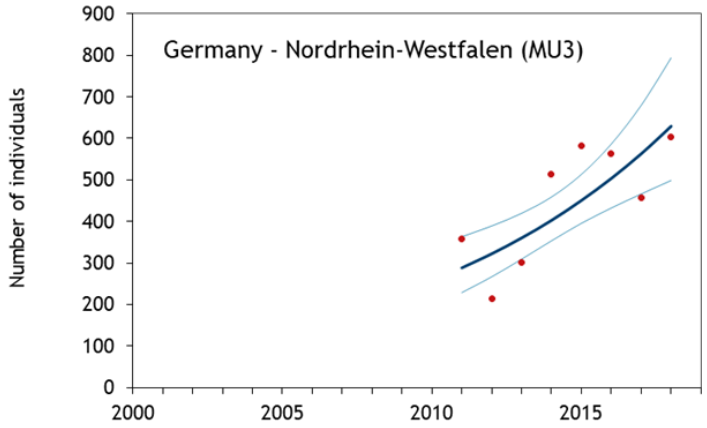
Short-term trend at MU level (examples)

- 7-12% increases per annum since start of data series
- Tendency for levelling off in the Netherlands
- Strong ongoing increase in North Rhine Westphalia, but numbers small (note differences on y-axis!)







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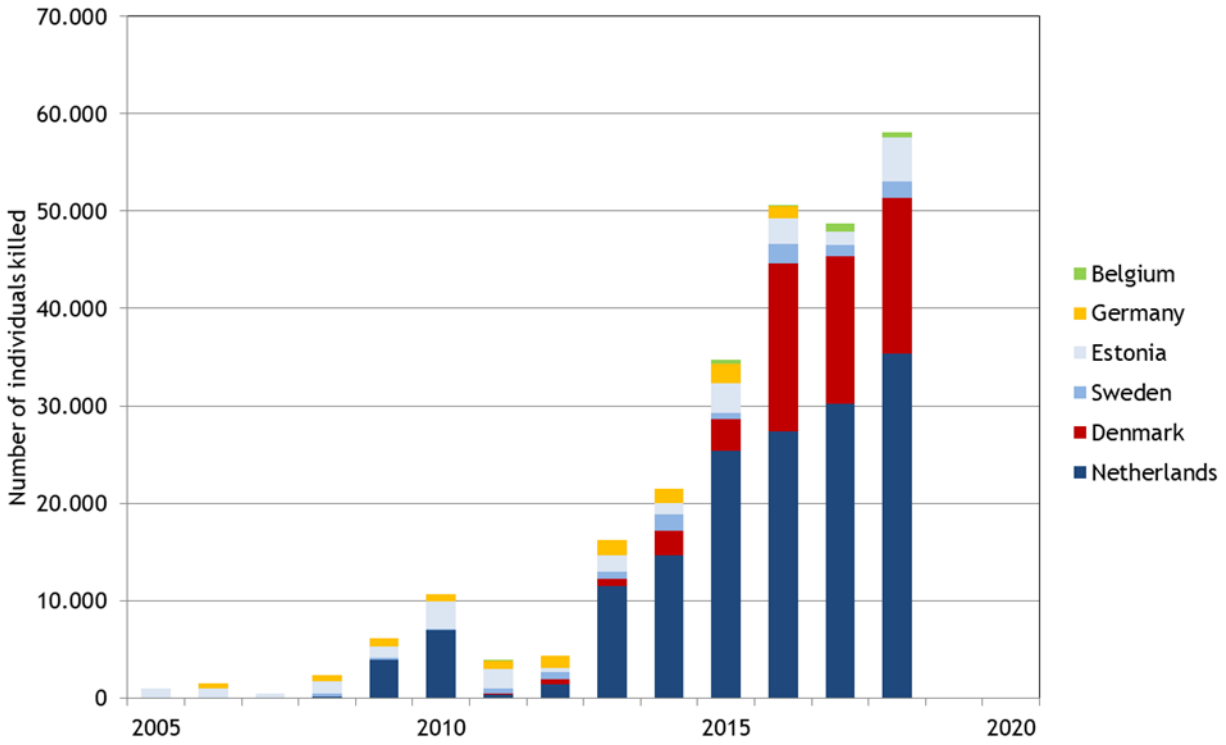
Offtake (derogations)

- Nearly 6-fold increase between 2010 and 2018, recently 50-60.000 individuals killed annually
- Mainly NL and DK, in 2016: 88% of all offtake
- Likely to affect all 3 MUs – but only reflect derogations in EU. Offtake (harvest, mainly spring) in Russia unknown



Data from Eionet central data repository and national data (2017 + 2018 Germany missing)

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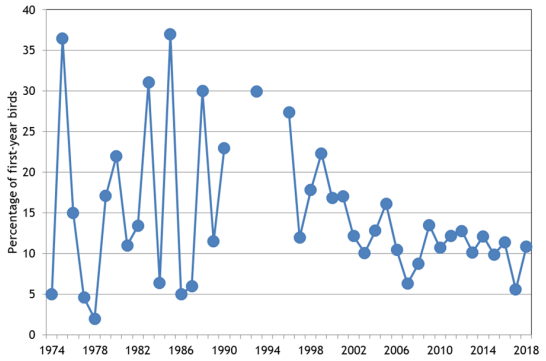
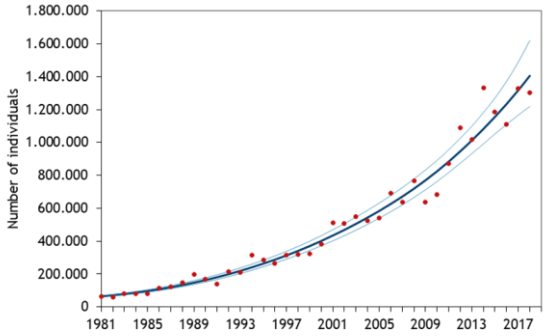
Development of an Integrated Population Model (IPM)

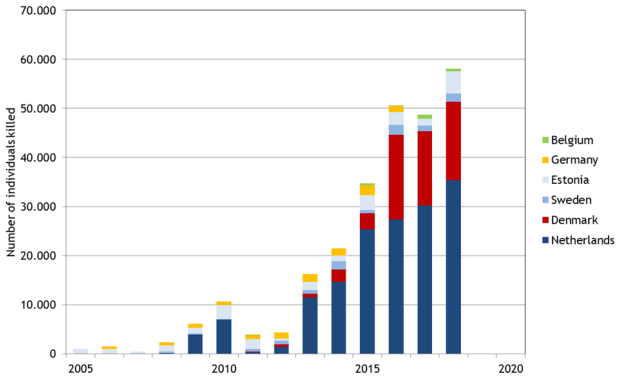
Productivity (% first-year)



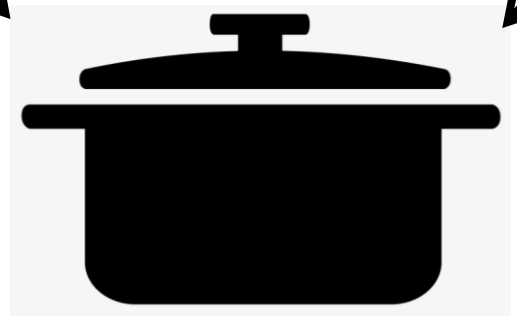
Counts (numbers)



Offtake (derogations)



Survival data (capture-mark-resighting data derived from geese.org)



assumptions regarding missing data (to be refined later on) data patterns and observation errors

Hans Baveco

Paul Goedhart

Doc EGMIWG/5.18 [annex 3]

IPM Barnacle Goose

- Focus on Russian breeding population (MU1)
- Aiming for
  - Reconstructing population dynamics and assessing current state (size) of the Russian population (accounting for numbers present in MU2 and MU3)
  - Estimating demographic rates in the Russian population (productivity and survival rates) (MU2 and MU3 will follow later on, depending on data availability)
  - Assessing the offtake rate of the Russian population by (unknown) harvest in Russia and derogations in EU-countries
- → IPM results will provide base for projections of future population development and impact assessment of derogation effort

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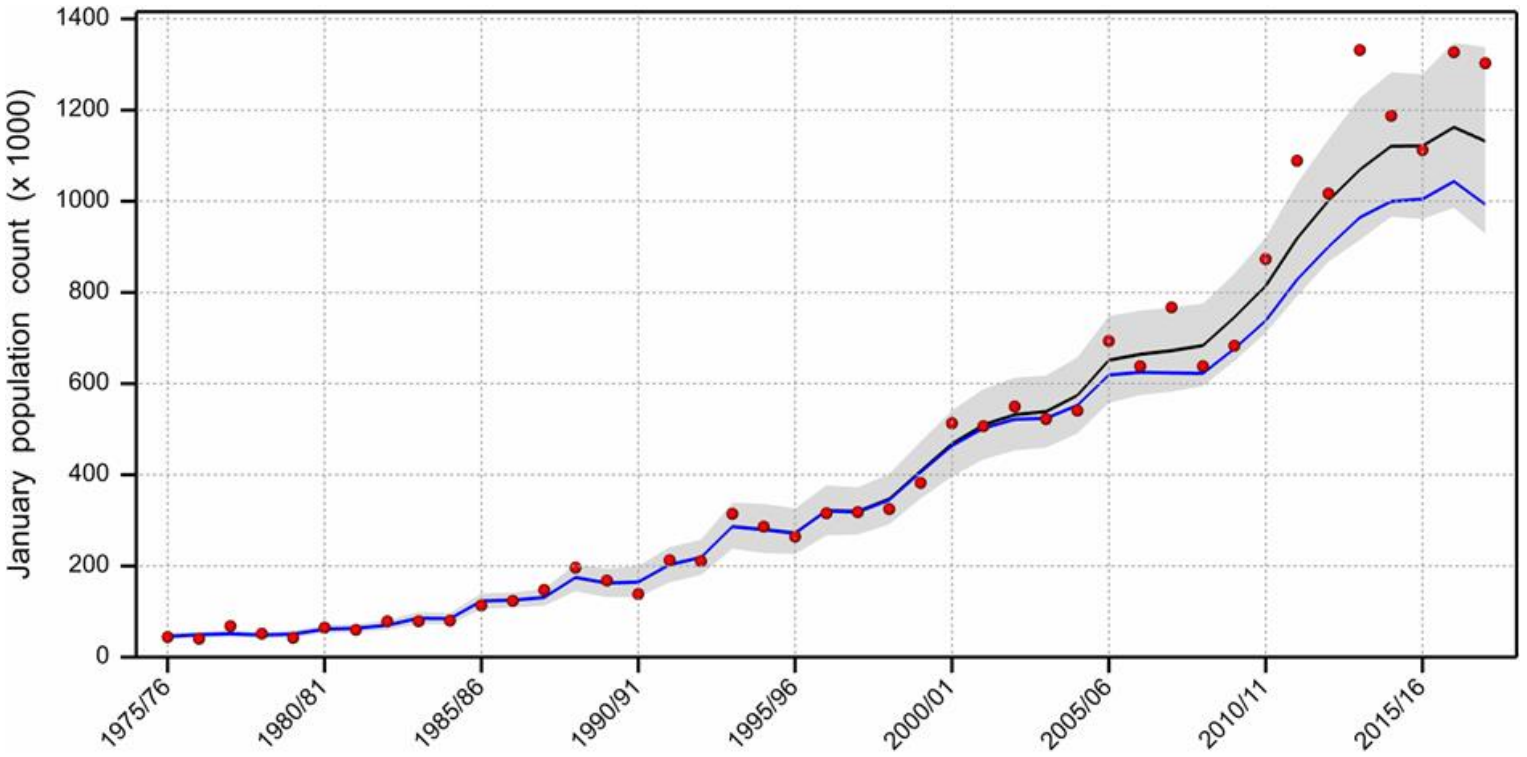
IPM Results: population size and trend

- Model corresponds very well with count data (outliers e.g. 2012, 2014)
- In recent years, population seems to level off; Russian population (MU1) model estimate of about 1 million individuals



red dots: January count data
black line: modelled population size (blue for Arctic breeders, MU1)
shaded: 95% ci for modelled population size

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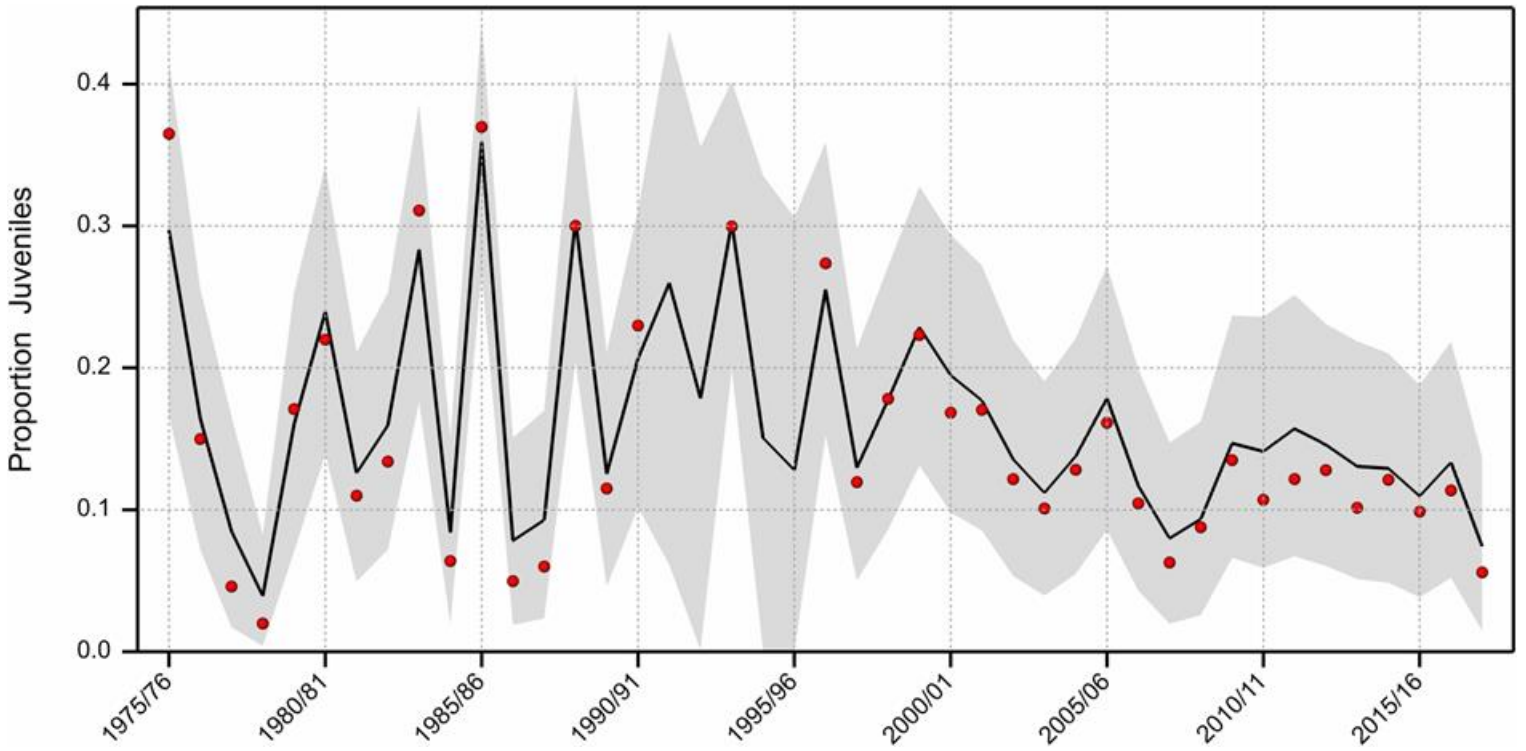
IPM Results: productivity

- Model corresponds very well with field data
- After 2000 stabilisation in productivity, from 2006/07 onwards mean proportion of juveniles 0.12
- Reproduction rate (fledglings / adult pair, not shown in graph) since 2006/07 around 0.5 – similar dynamics as proportion of juveniles



red dots: assessed proportion of juveniles in the field
black line: modelled proportion of juveniles
shaded: 95% ci for modelled proportion of juveniles

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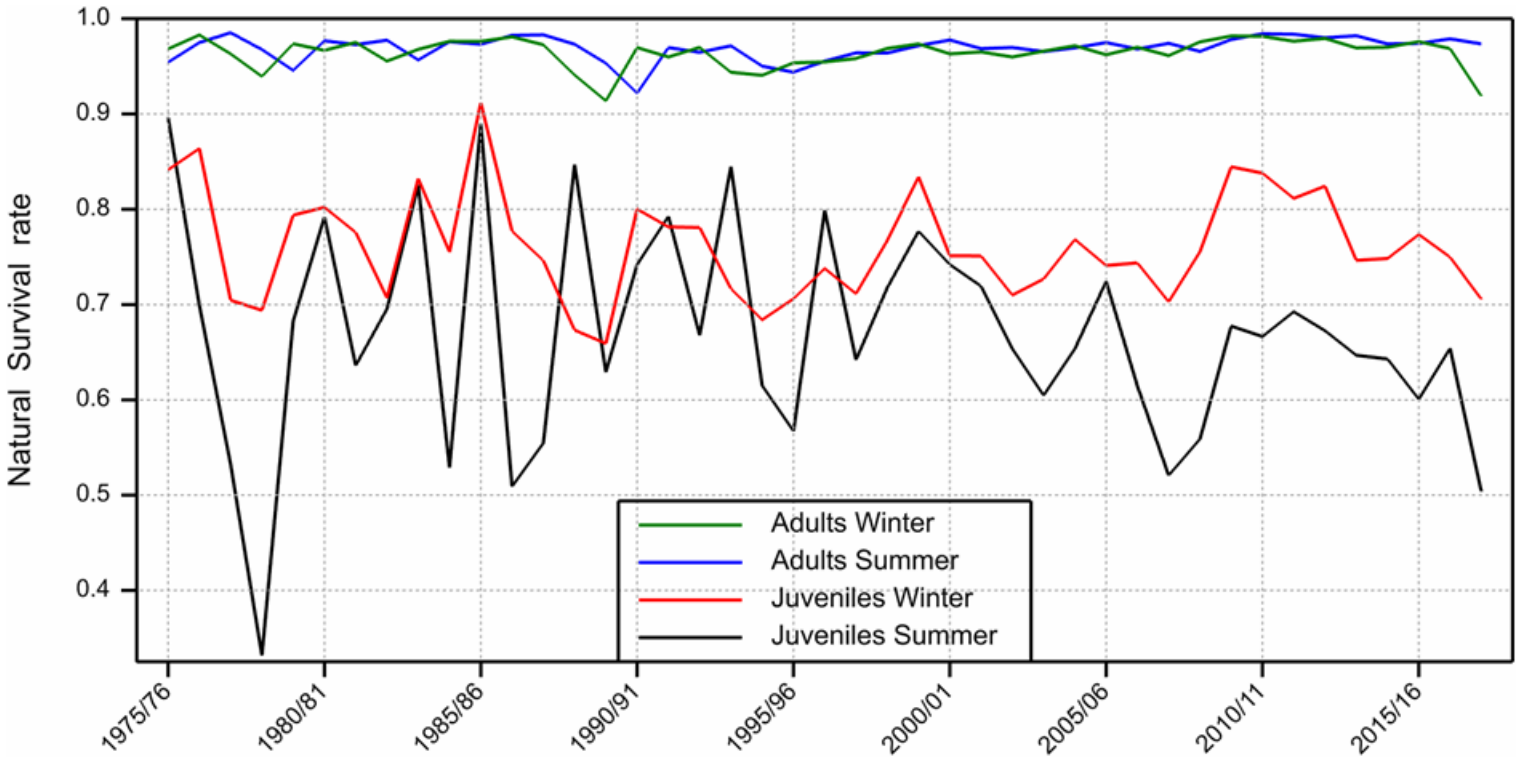
IPM Results: survival

- This includes unknown harvest in Russia but takes into account derogations in EU
- Survival highest in adult birds, both "winter" and "summer", rather constant over time
- Survival in juveniles highly variable, lowest in "summer" (i.e. first autumn).



„winter": 15 January – 15 July >(<u>after</u> January census)
„summer": 15 July – 15 January (<u>prior</u> to January census)
(two time steps distinguished in the IPM)

Comparison CMR / IPM (after 2007), on annual basis. Estimates only differ for adults, lower in CMR (ring loss?)

0.8233/0.9324

0.4279/0.4659

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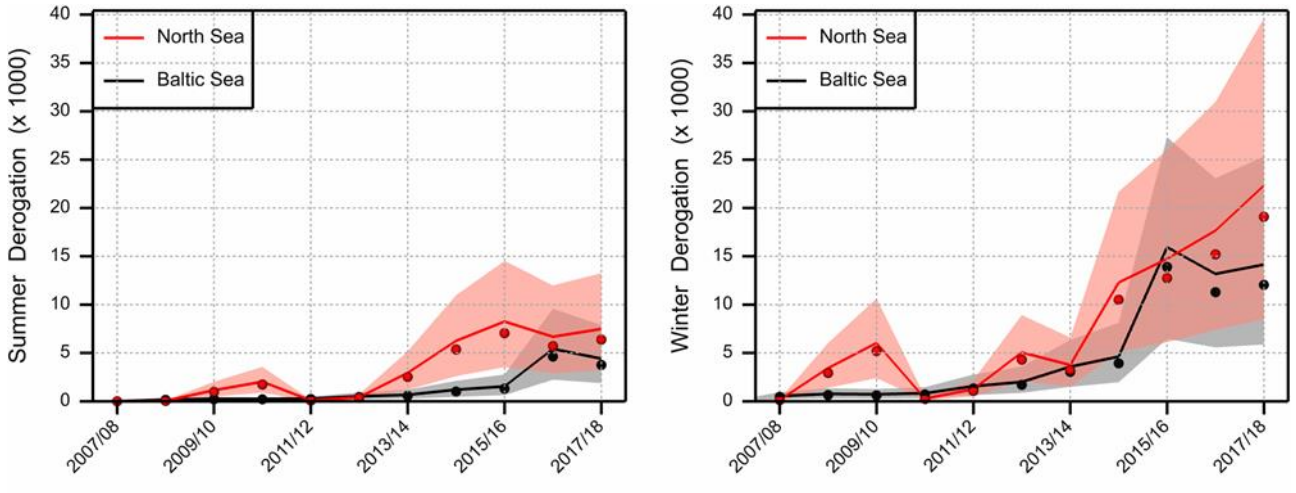
IPM Results: derogations

- MU 2 and MU 3
- Model matches quite well with recorded derogation figures (but note wide confidence interval in the end)
- Mean offtake rates based on model output 0.5% for "summer" (s) and 1.5% for "winter" (w)



„winter": 15 January – 15 July (after January census)
„summer": 15 July – 15 January (prior to January census)
(two time steps distinguished in the IPM)

dots: measured derogations
lines: modelled derogations (with 95% ci)

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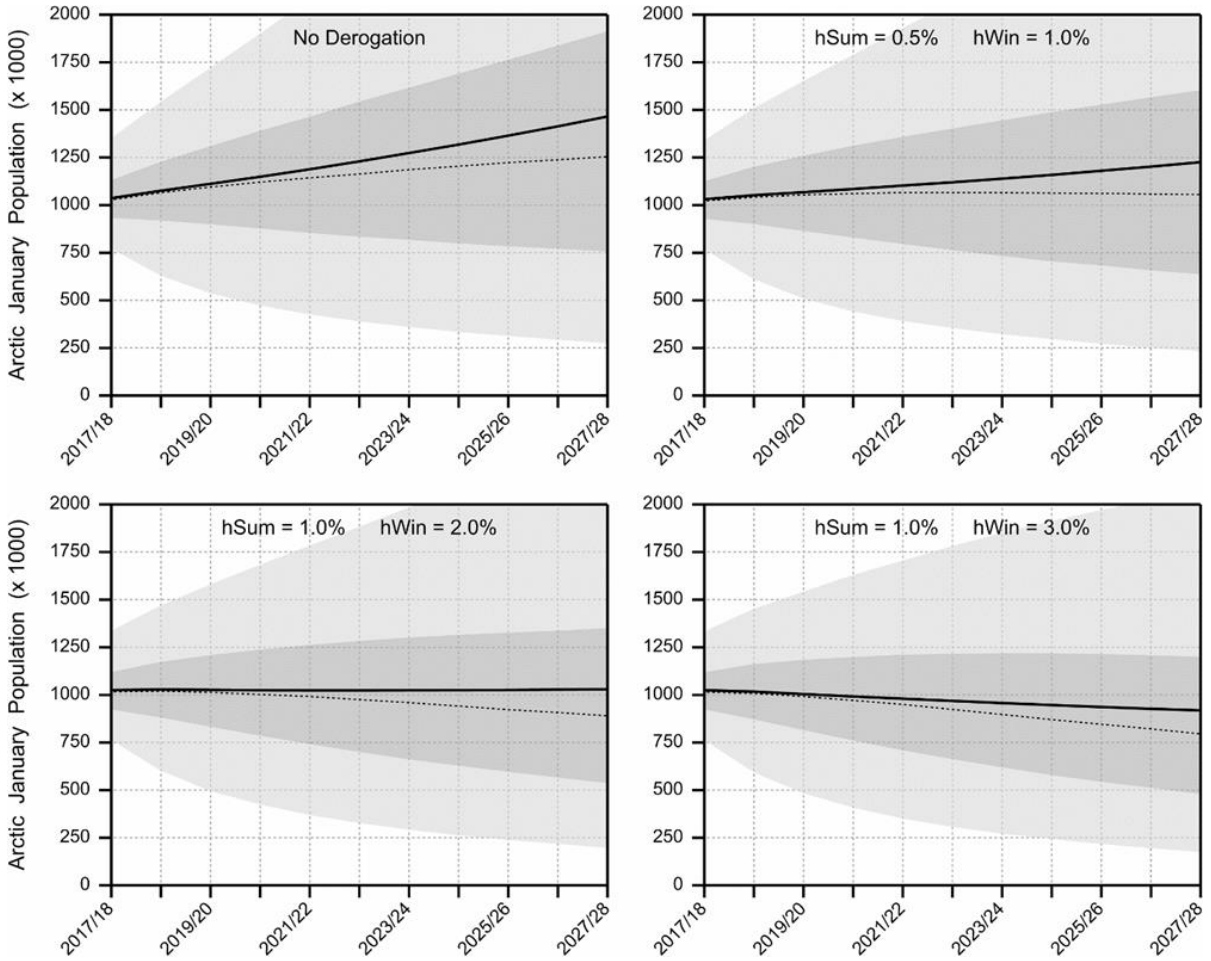
IPM simulation of future derogation effort

- Model output from last year projected to future years
- Extremes from no derogation to ~ 3% offtake in "winter", similar to current situation
- Largest offtake rate may result in population decline, with current survival and productivity levels



4 scenarios with either no derogation of different offtake rates for summer and winter

still very preliminary simulations – just some examples, note huge variation (shades areas)!

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How to proceed / Recommendations

- Current January counts provide good abundance estimates at flyway level, as shown by count data and IPM, but data should become available with smaller time-lag
- Extension of counts in (late) summer needed to estimate abundance in each MU – especially important Sweden (missing completely now), but also Denmark (→ more frequent interval), Norway & Germany (→ improve coverage).
    - Estimate MU1 possible by subtracting numbers in MU 2 and MU 3
- Estimates of productivity would become available in each MU when carried out in conjunction with summer counts (at present: only assessments in winter, mainly MU 1)
- Derogations can be taken from annual derogation reports to EU but preferably should come with monthly resolution, to be able to better link them to appropriate MU-level. One annual figure is not sufficient to achieve this
- IPM will be extended to MU 2 and MU 3 and some assumptions made so far backed by data

Thank you for listening!

Ministry of Agriculture, Nature and Food Quality

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