

Arctic migratory birds: a global concern



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Black-legged kittiwake (*Rissa tridactyla*) © Garry Donaldson



Institute of Zoology

LIVING CONSERVATION

Outline



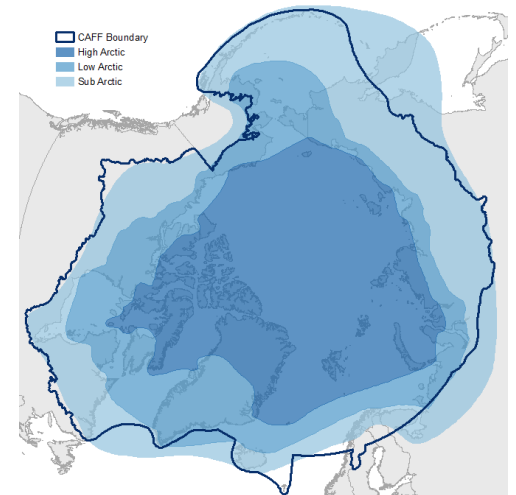
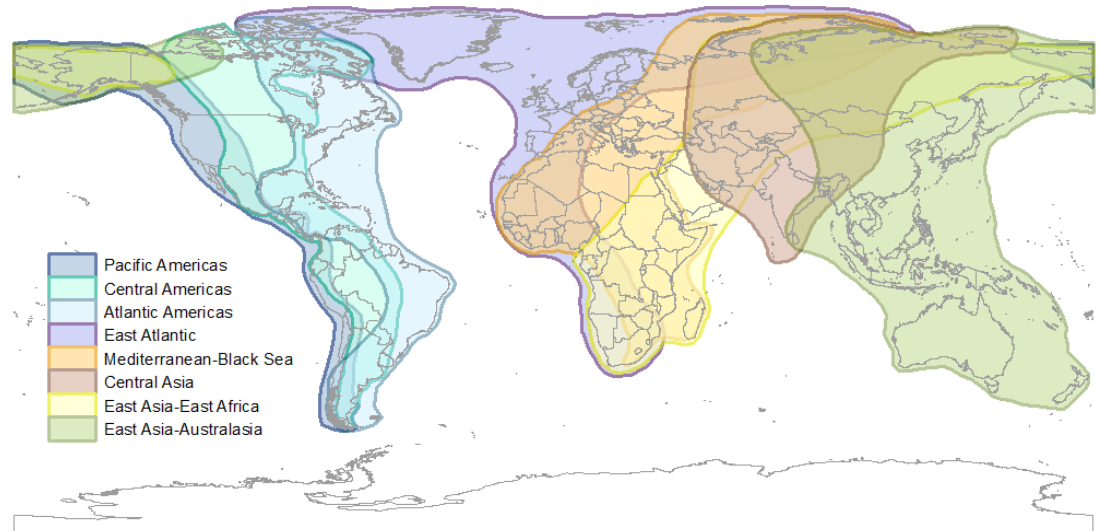
- Definitions
- Introduction
- Methods
- Results
 - Global
 - Flyways
 - Species
- Caveats
- Conclusions



Definitions



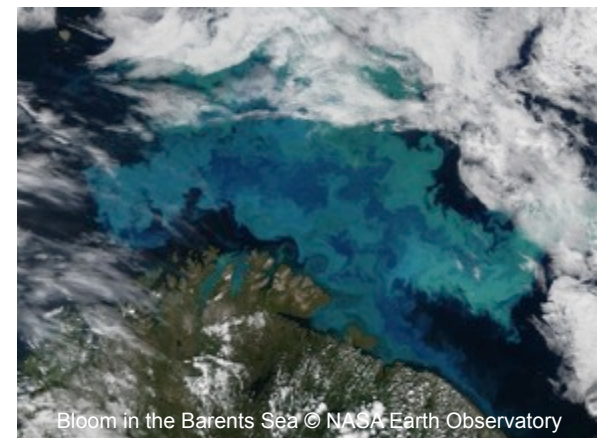
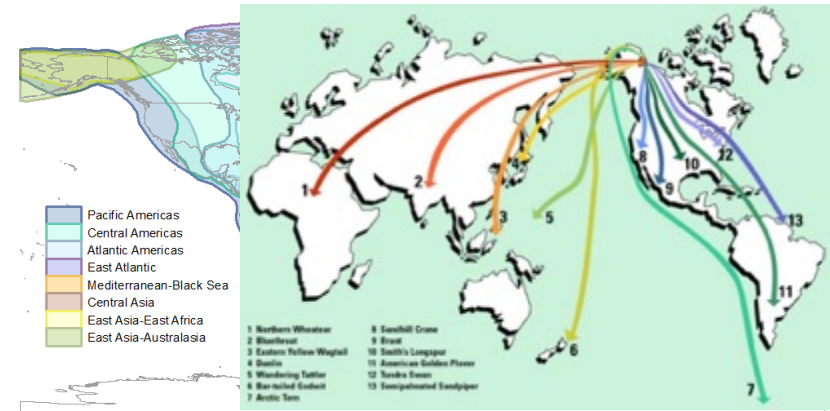
- Migration
- Arctic migrant
- Flyway
- Taxonomic group
- Population
- Time-series



Arctic migratory birds



- 1,855 or 19% of bird spp migrate
- Flyways
- Arctic is starting point for many:
 - 279 or 2% of bird spp
 - 50% of geese & 80% of shorebirds (individuals)
- Why?
 - Productive summers -> abundant food
 - Safety
 - Continuous daylight
 - Fewer predators
 - High numbers of other prey

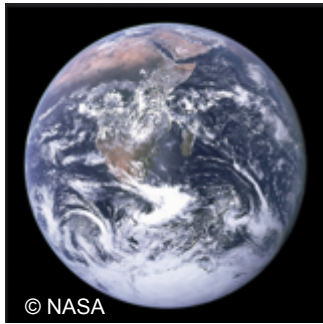


Bloom in the Barents Sea © NASA Earth Observatory

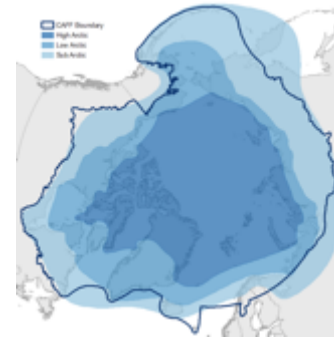
Threats



- A number of migrants are at risk
- Threats along route



- habitat loss & degradation
- hunting
- over-exploitation of food
- pollution
- agricultural intensification & expansion beneficial (geese)



- CC (humidity, snow & shrub cover, tundra distribution)
- rodent cycles
- some benefit!

- Multiple threats, different stages
- Single threat can affect > 1 spp



Conservation



- Good knowledge of certain sites and species but no global picture
- CAFF/CMS have asked for overview to help set conservation priorities
- Results can contribute to policy themes:
 - Identifying important areas
 - Reducing stressors
 - Improving knowledge
- Results can encourage participation
- Link to Arctic Biodiversity Assessment



Methods



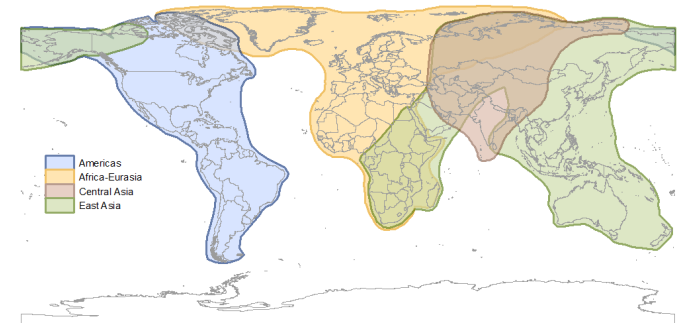
- 160 reference species from ABA
- Indices of abundance for 129 of these (1970-2011)
- Data & method from the Living Planet Index
- Generalised additive modelling framework + baseline
- Used for Arctic Species Trend Index 2010
- Data held in the Living Planet Database
 - 14,884 time-series of 3,169 vertebrate species
 - freely available!



Non-Arctic data and flyways



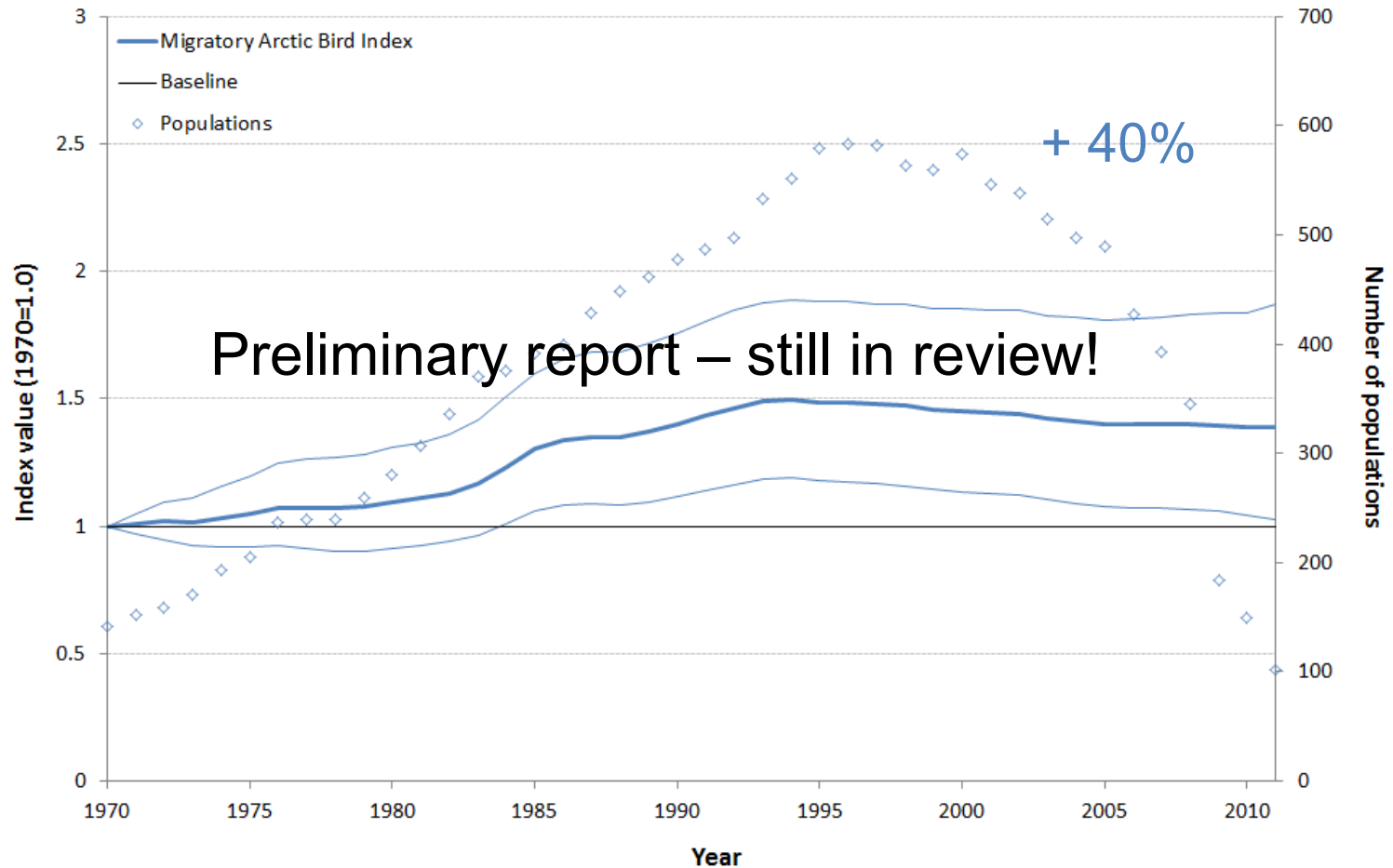
- Included data from inside and outside the Arctic
 - To capture influences at different points during a species' annual cycle
 - Data availability (key sites)
- Combined Flyways into four regions
 - Reduce overlap
 - Ecological: shared threats
 - Political: interconnectivity of sites
 - Better for effective conservation
- Larger data set = more robust trends, opportunity for disaggregation



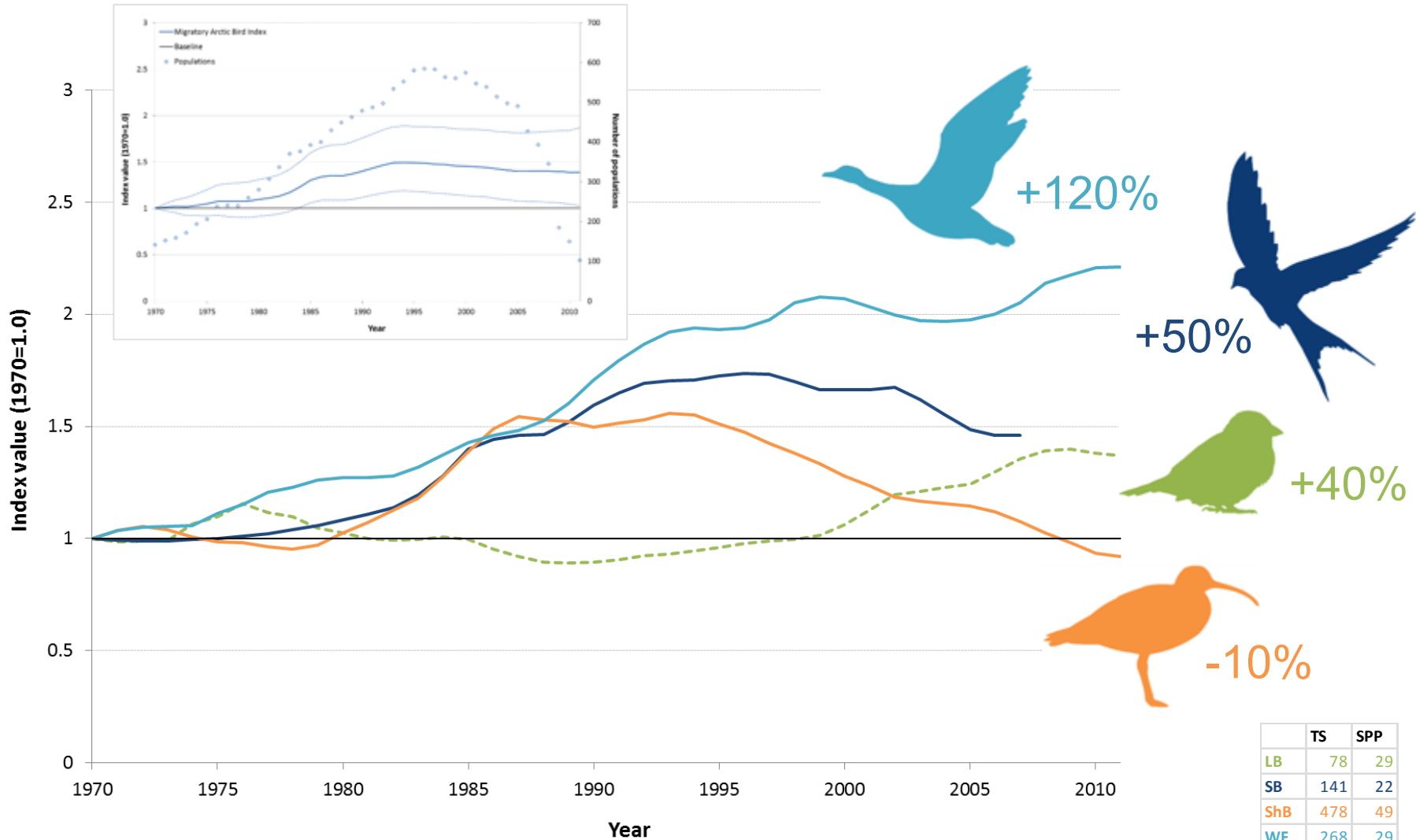
Results: Global



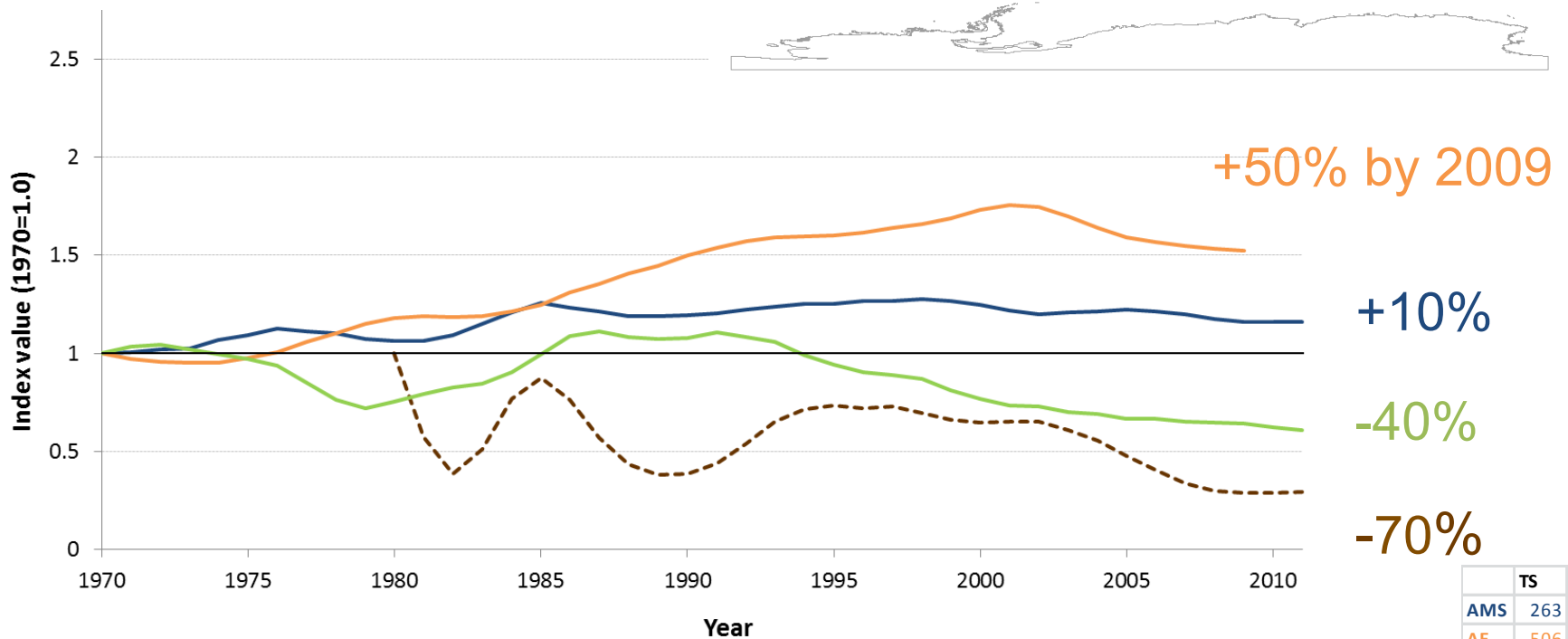
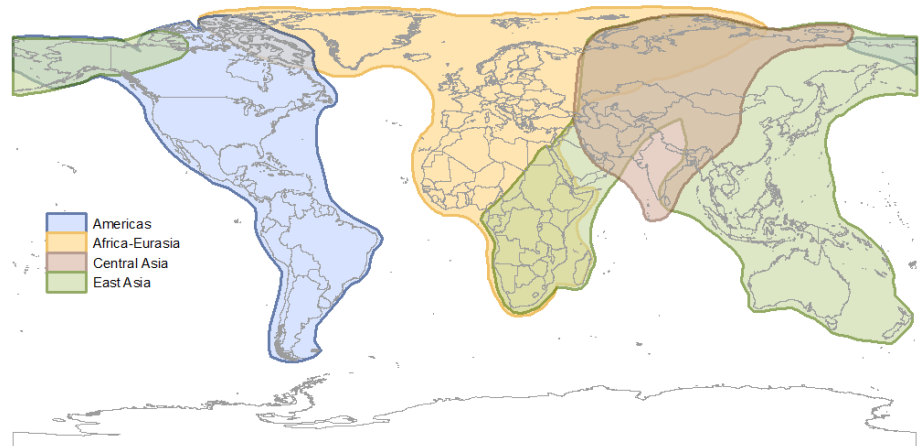
- 966 time-series of 129 species



Results: Taxonomic group

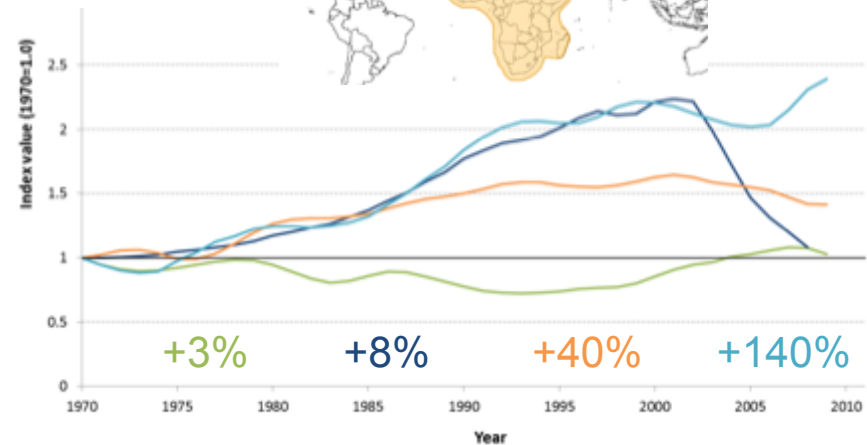
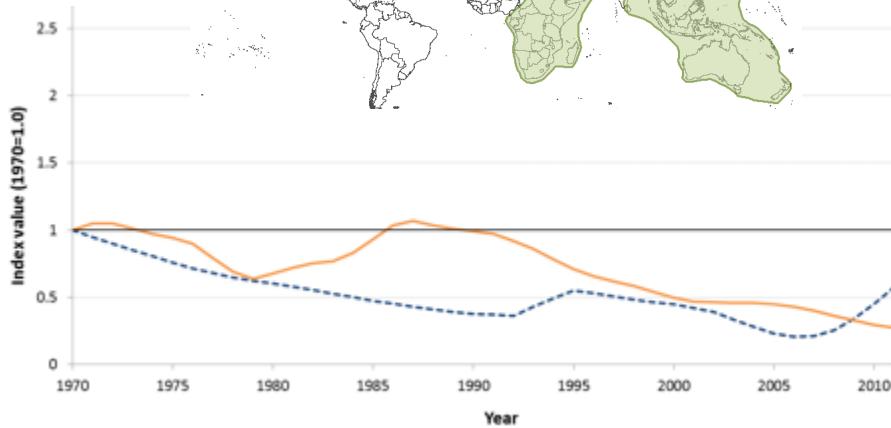
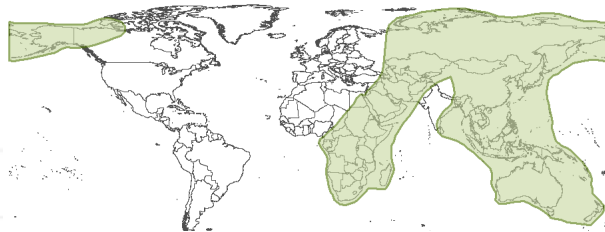
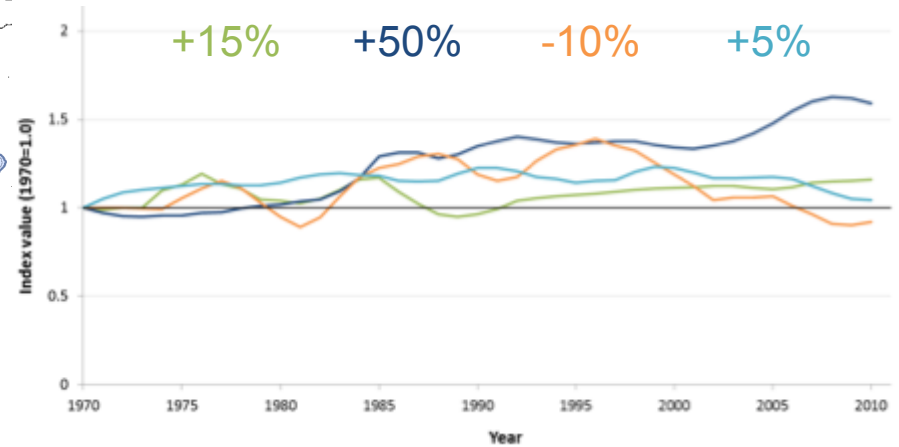


Results: Flyways



	TS	SPP
AMS	263	84
AE	506	73
CA	36	25
EA	220	45

Results: Flyways and taxonomic groups

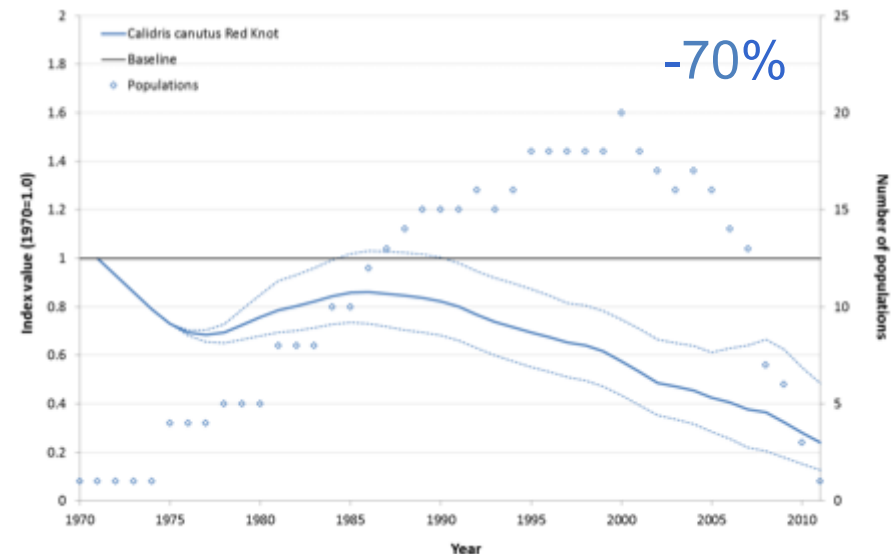


	LB	SB	ShB	WF
AMS	29, 19	77, 20	95, 25	62, 20
AE	40, 16	65, 15	209, 24	62, 20
EA	-	7, 7	195, 28	16, 8

Case study: Red knot



- 70% decline since 1970
- Comparable trends across regions
- Causes?
 - Arctic: lemmings
 - Outside: overharvesting of food, habitat loss
- Range shifts?



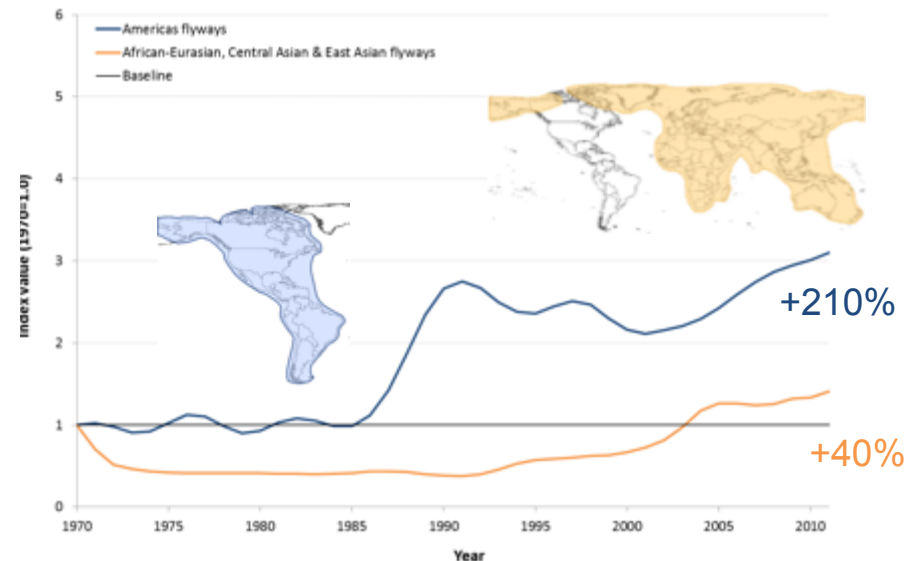
Case study: Greater white-fronted goose



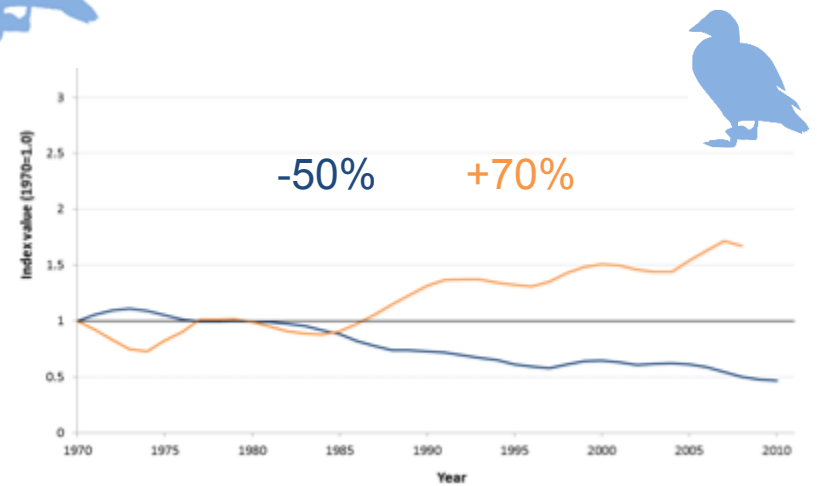
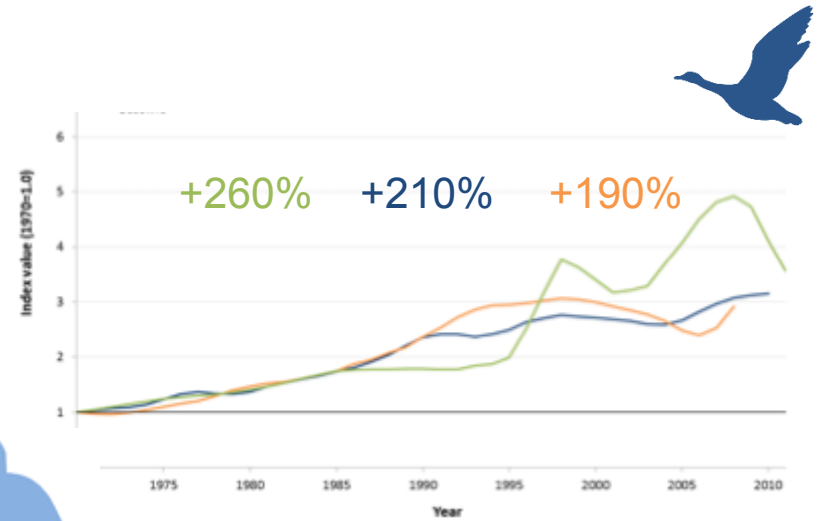
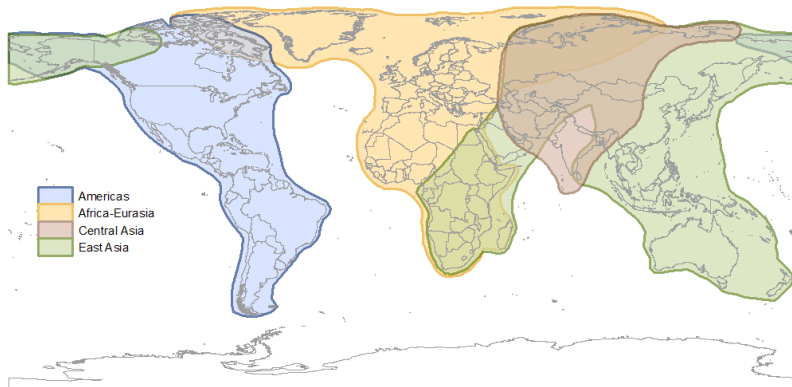
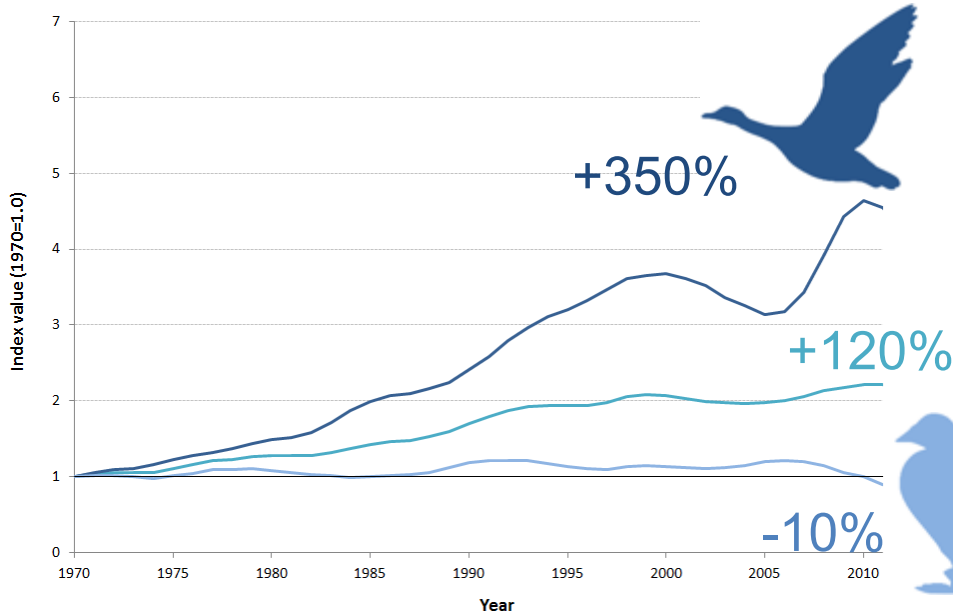
- Most widespread & numerous goose in W Palearctic
- Thriving since 1980s
- Hunting bans and regulated exploitation
- Eutrophication of grasslands & crops through agricultural intensification
- Range shifts?



Greater white-fronted goose (*Anser albifrons*), California
© USDA Natural Resources Conservation Service



Results: Waterfowl



Caveats

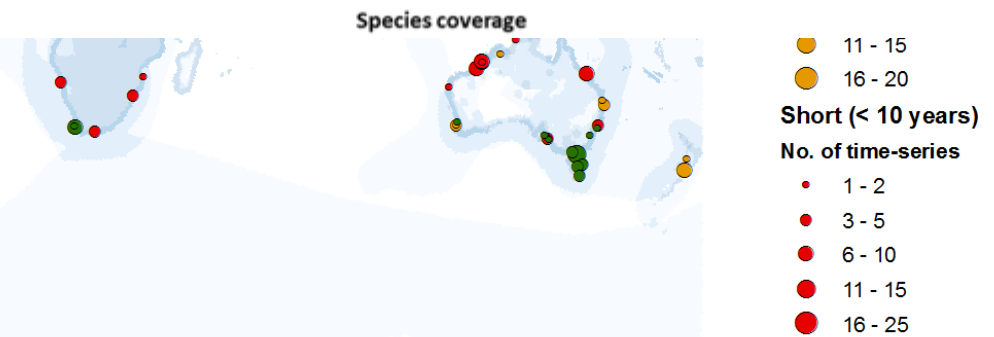
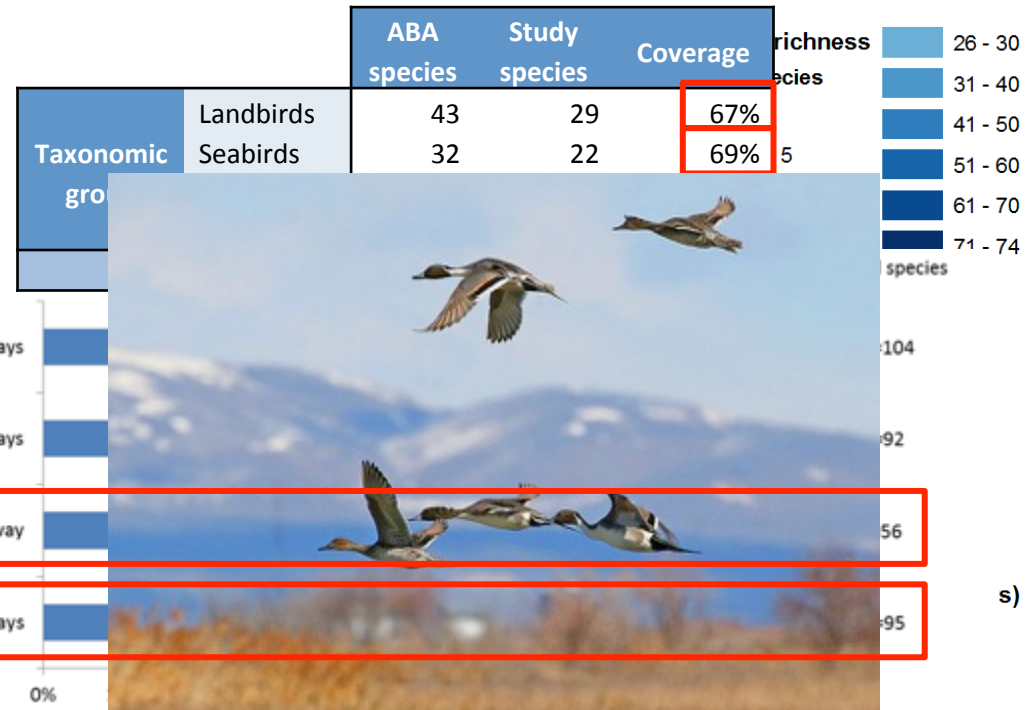


- Coverage

- Species
- Spatial & temporal
- Flyway populations

- Data needed

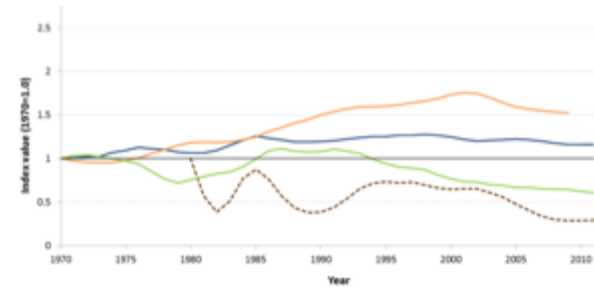
- Available but unused
- Non-existent
- Existing but unavailable



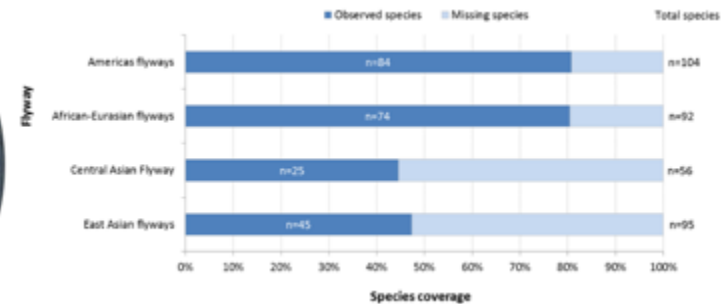
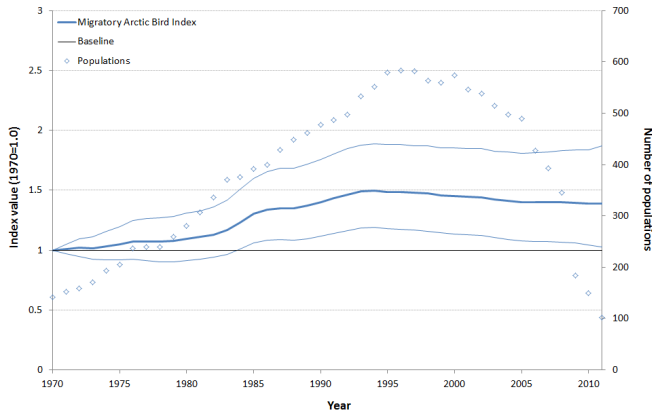
Conclusions



- Global increase in Arctic breeding migrant birds
- Differences between groups and regions
- Concern: **Central Asia** & **East Asia**
- Changes affect species in different ways
- Need to improve coverage
- Collaboration needed at the flyway level



A global concern!



Acknowledgements



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- Tom Barry, Michael Svoboda
- Garry Donaldson, Robin Freeman, Mike Gill, Victoria Johnston, Jonathan Loh, Hans Meltofte
- Funders
- You!



UNEP



WCMC



CMS



WWF

Coverage of individuals

