

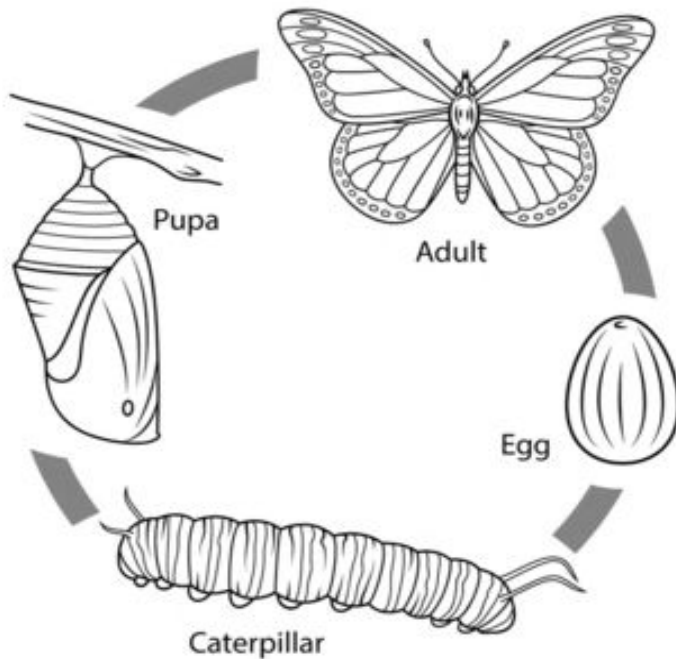
Butterfly indicators

David Roy (on behalf of the **eBMS**)



UK Centre for
Ecology & Hydrology

Butterflies as Indicators

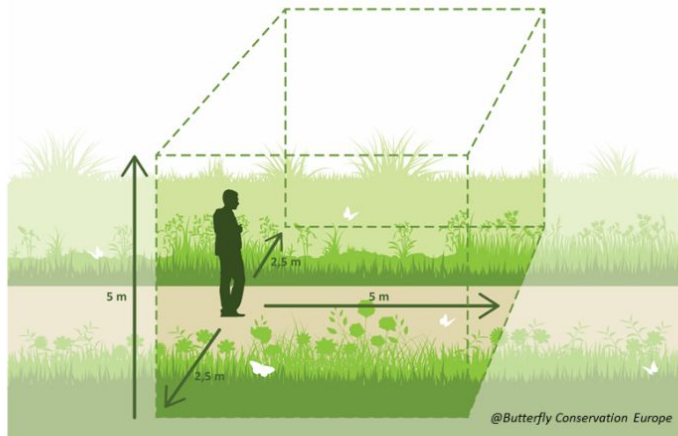
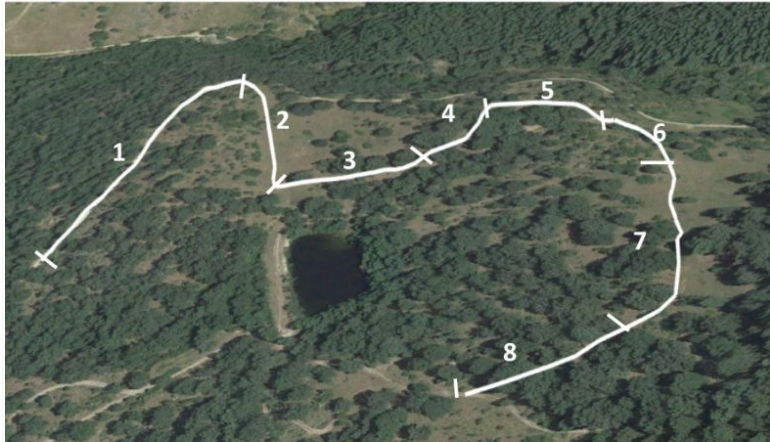


- Short-lived
- Respond rapidly to changes
- Several life stages
- Diverse group = diverse habitats
- Many habitat-specific species
- Well-known ecology and life cycles
- Represent insects (most diverse group) + pollinators
- Easy to observe
- Popular

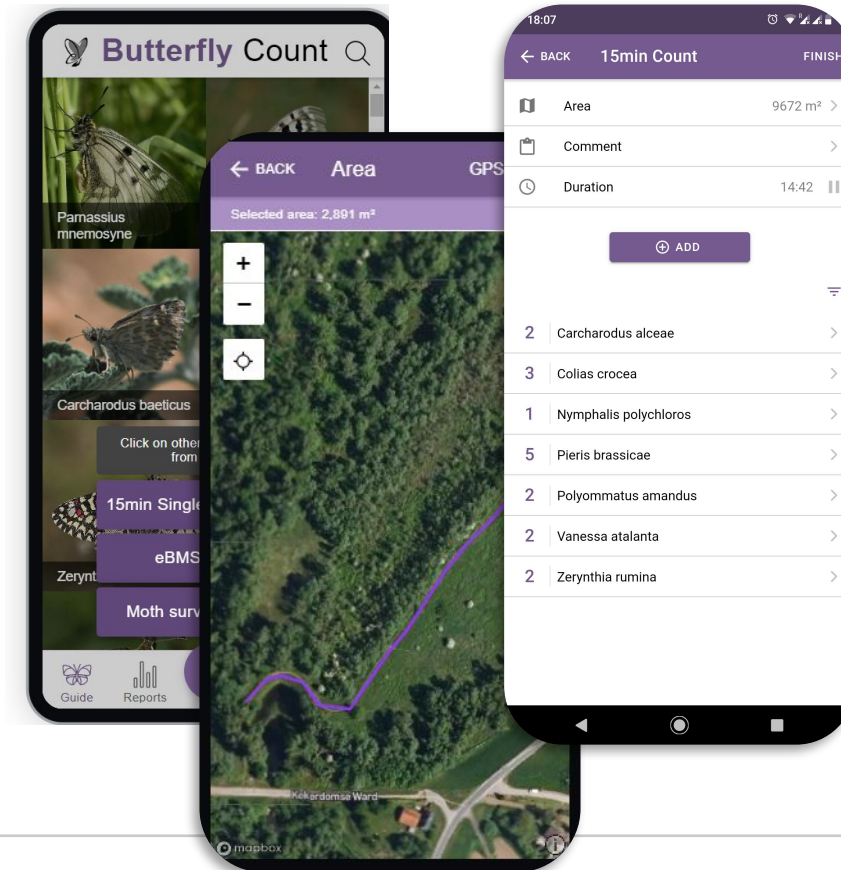


Monitoring methods

Transects



- Method developed in UK 1976
- Walked every week/2 weeks
- Min weather conditions
- Count every species in 5x5x5m box
- Enter data online or via app



A world leading dataset

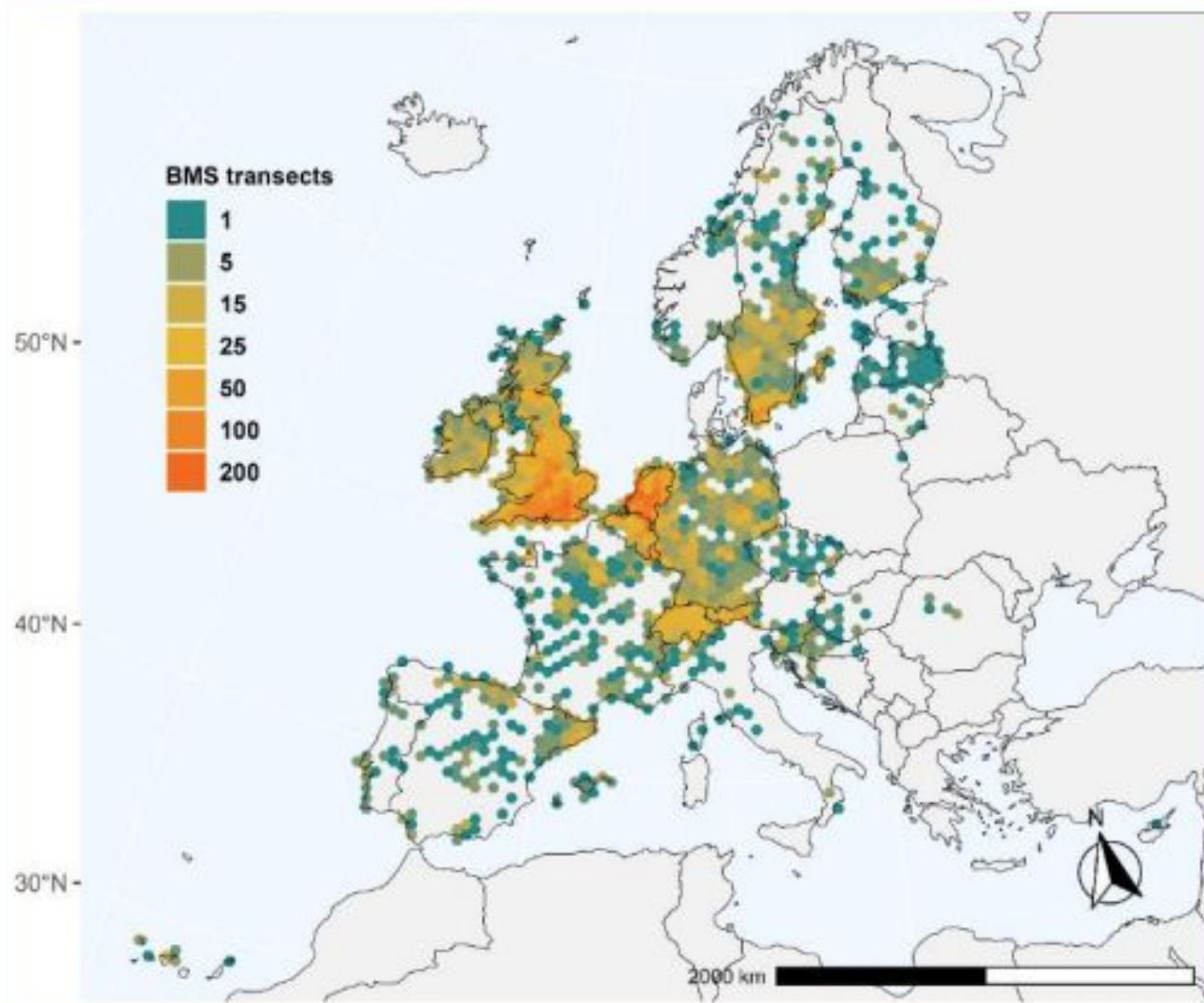


Figure 1: The density of Butterfly Monitoring transects visited per 50 km grid across all schemes that have contributed to the eBMS database. Densities are calculated from sites that have been visited at least once since 1990.

Schemes contributing to the European Indicators up to 2020 (schemes in the EU27 are marked with ^{EU27})

- Andorra: since 2004
- Austria (Tirol) ^{EU27}: since 2018
- Belgium (Flanders) ^{EU27}: since 1991
- Belgium (Wallonie) ^{EU27}: since 2010
- Czech Republic ^{EU27}: since 2010
- Estonia ^{EU27}: since 2004
- Finland ^{EU27}: since 1999
- France ^{EU27}: since 2005
- Germany ^{EU27}: since 2005
- Hungary ^{EU27}: since 2016
- Ireland ^{EU27}: since 2007
- Italy ^{EU27}: since 2016
- Jersey: since 2004
- Latvia ^{EU27}: since 2015
- Lithuania ^{EU27}: since 2009
- Luxembourg ^{EU27}: since 2010
- Netherlands ^{EU27}: since 1990
- Norway: since 2009
- Romania ^{EU27}: since 2013
- Spain (Catalonia) ^{EU27}: since 1994,
- Spain (Basque Country) ^{EU27}: since 2010
- Spain (other regions) ^{EU27}: since 2014
- Slovenia ^{EU27}: since 2007
- Sweden ^{EU27}: since 2009
- Switzerland: since 2003
- United Kingdom: since 1976

Other active schemes (data not yet included within indicators)

- Armenia: since 2003
- Austria (other regions) ^{EU27}: since 2020
- Cyprus Island ^{EU27}: since 2019
- Israel: since 2009
- Portugal ^{EU27}: since 2019
- Russia (Bryansk region): since 2013
- Ukraine (Transcarpathia): since 1974
- Malta ^{EU27}: since 2020
- Bulgaria ^{EU27}: since 2020
- Poland ^{EU27}: since 2020
- Croatia ^{EU27}: since 2020

Analysis to account for gaps

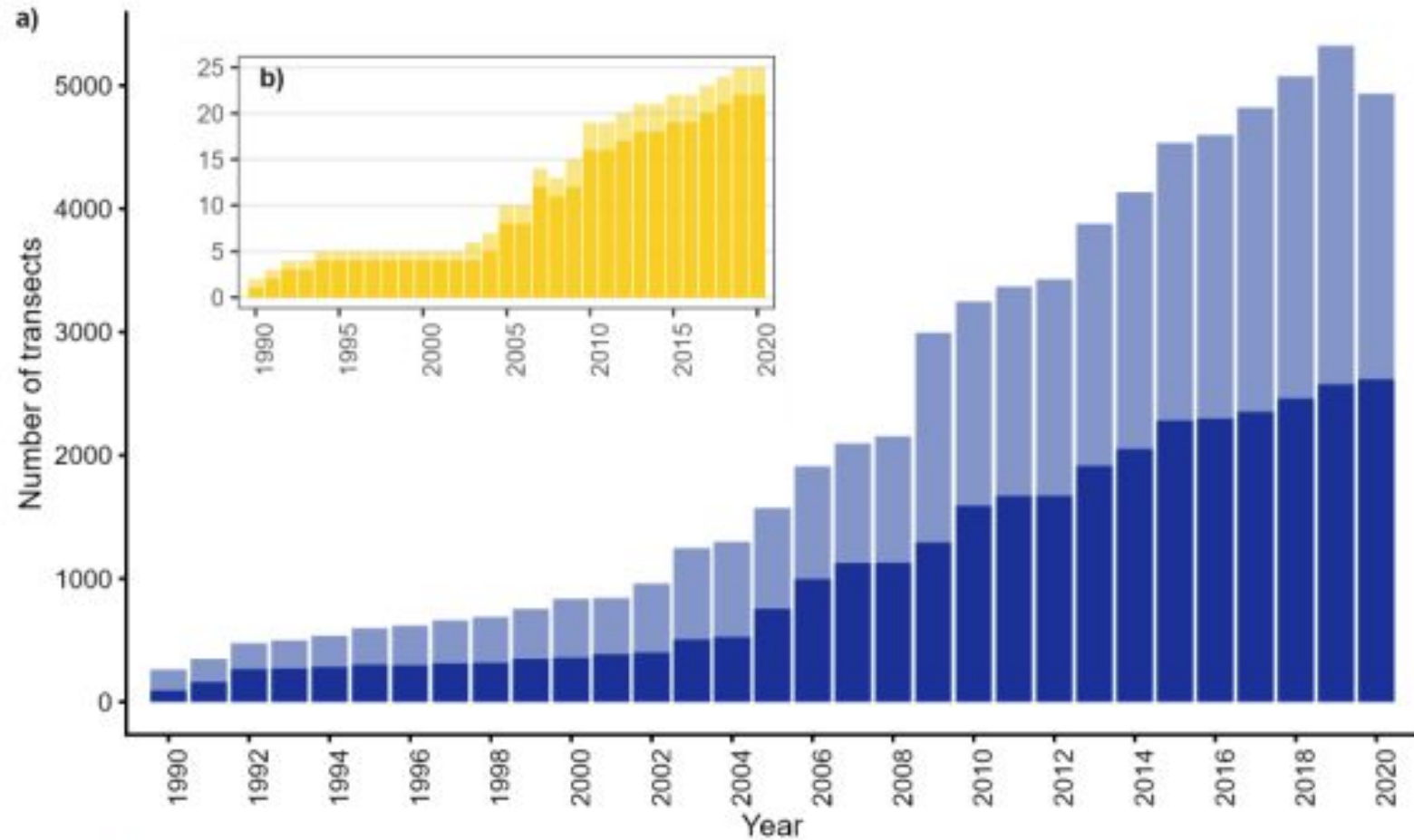
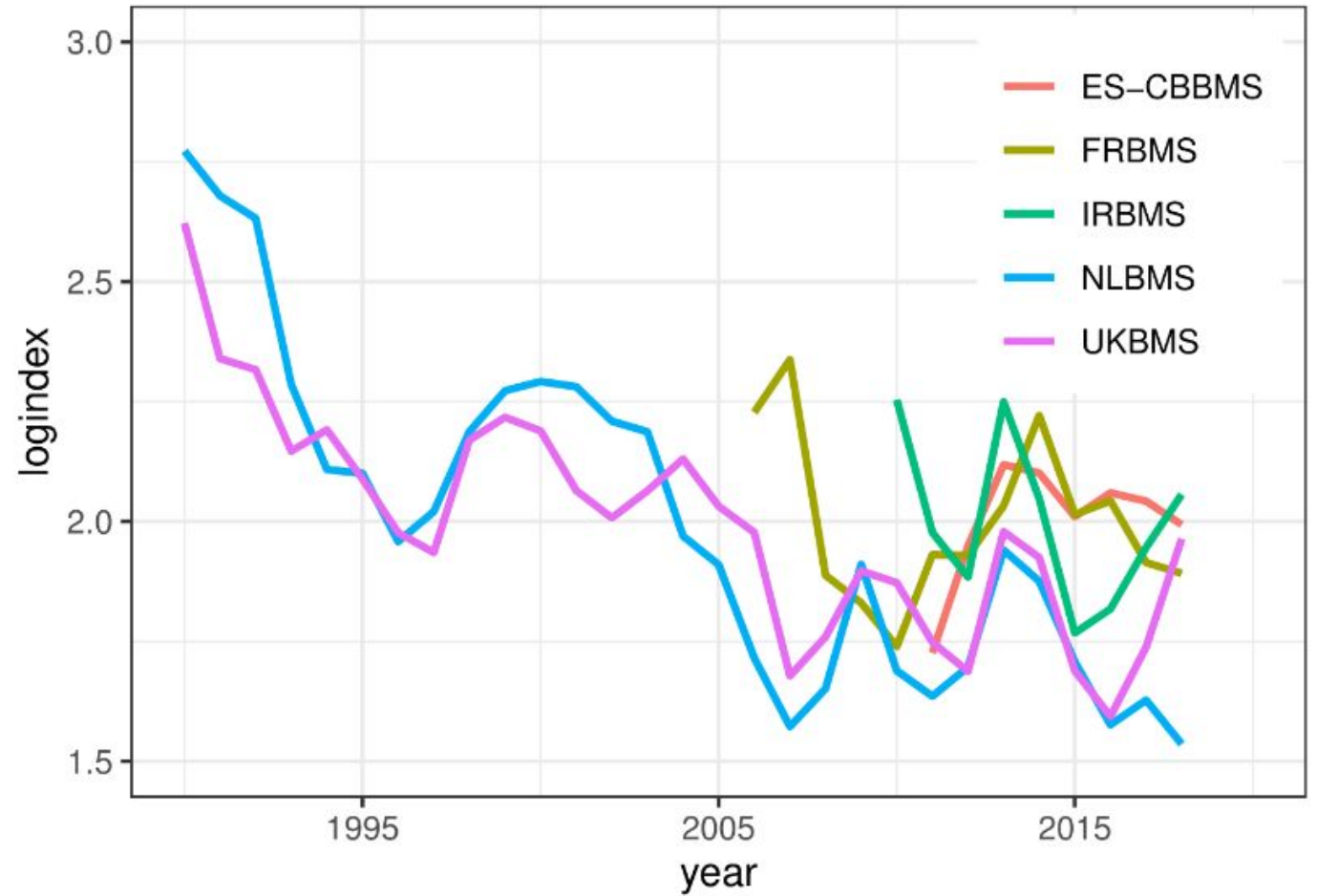
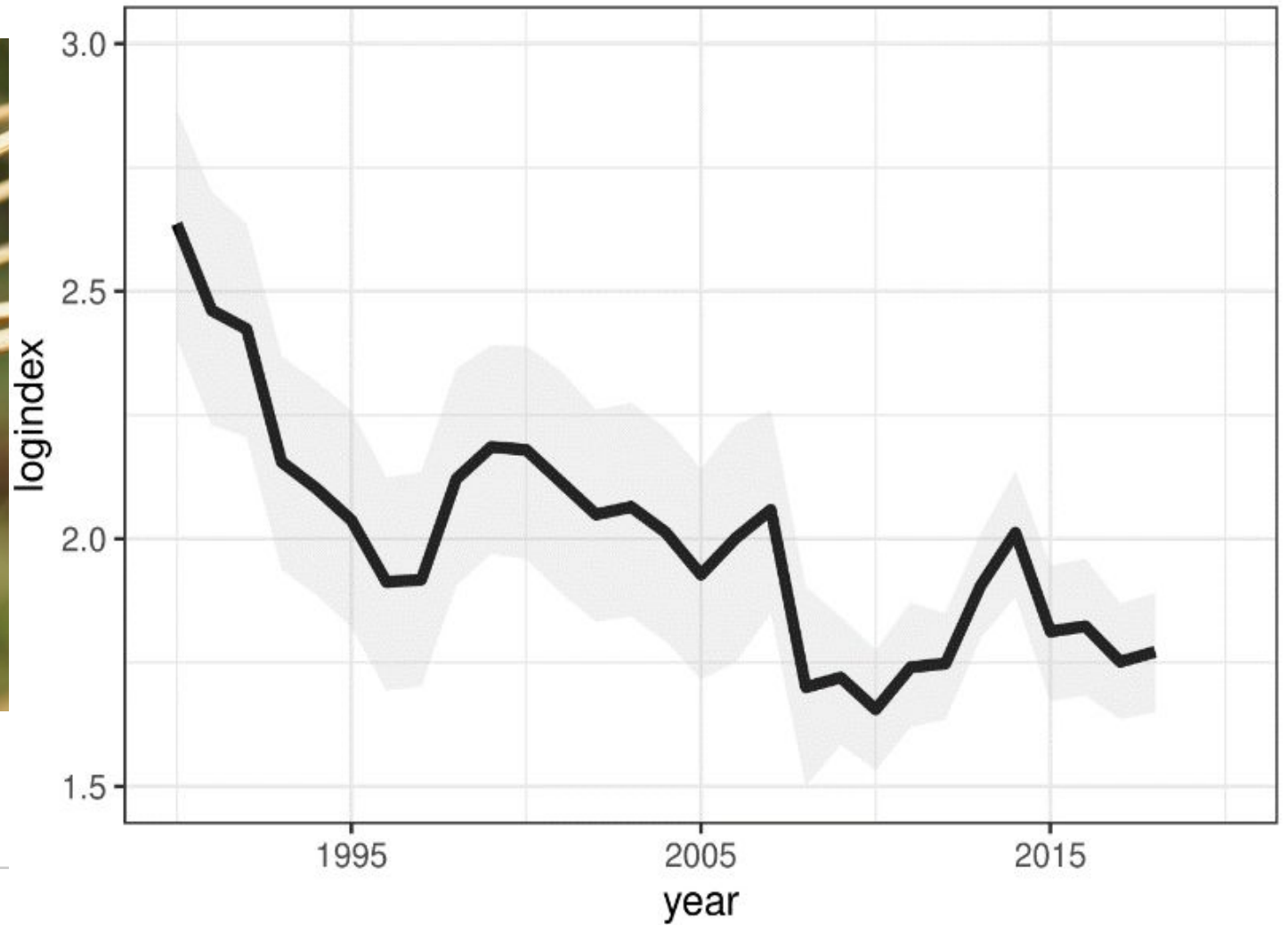


Figure 2: a) Number of transects that contributed to the Grassland Butterfly Indicator in Europe (pale blue) and EU27 (dark blue); b) number of Butterfly Monitoring Schemes (BMS) that contributed to the Grassland Butterfly Indicator in Europe (pale yellow) and EU27 (dark yellow). Only transects that have at least one record for at least one of the 17 selected species are included in the Grassland Butterfly Indicator.

Wall (*Lasiommata megera*)

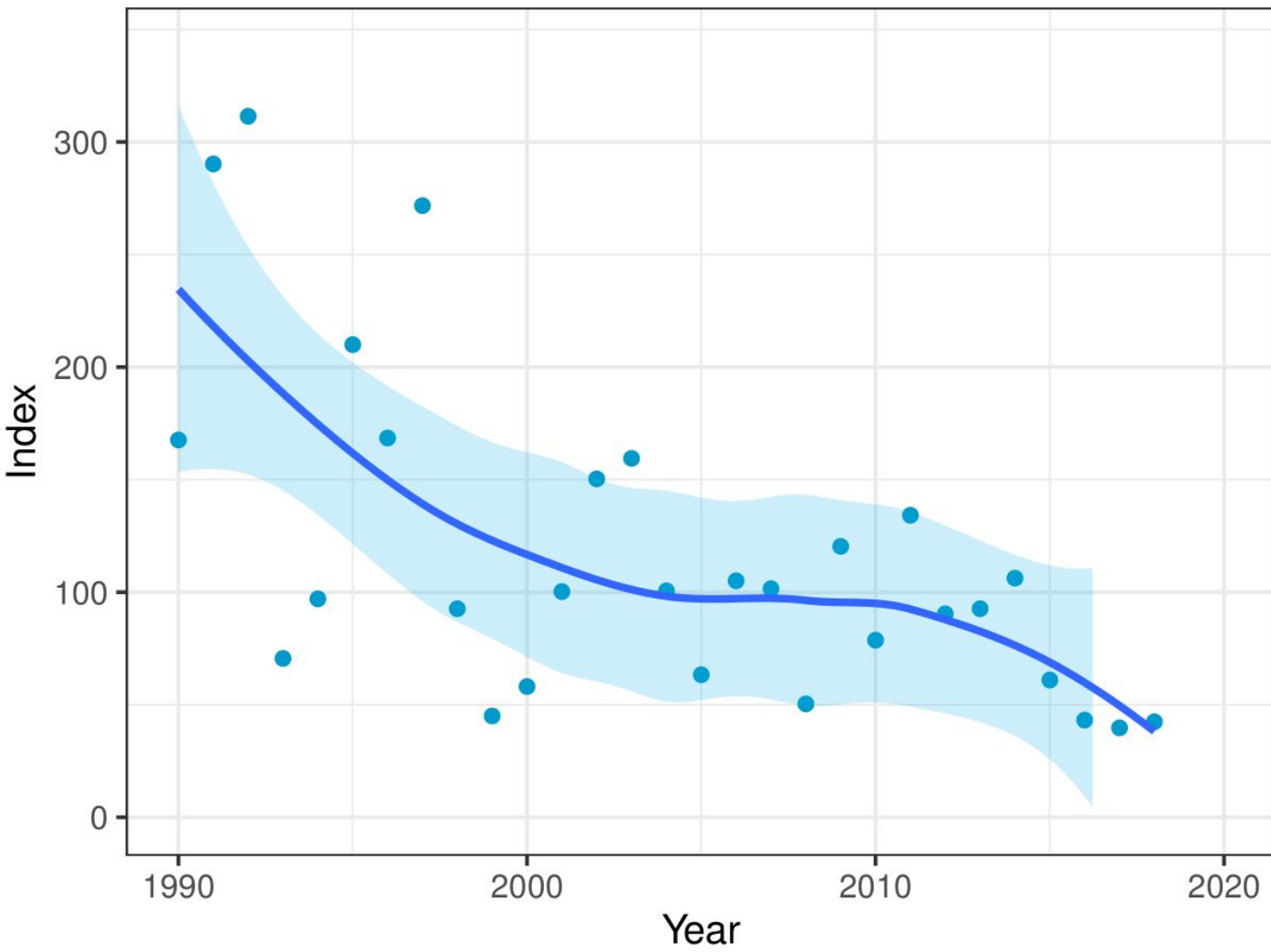


Wall (*Lasiommata megera*)



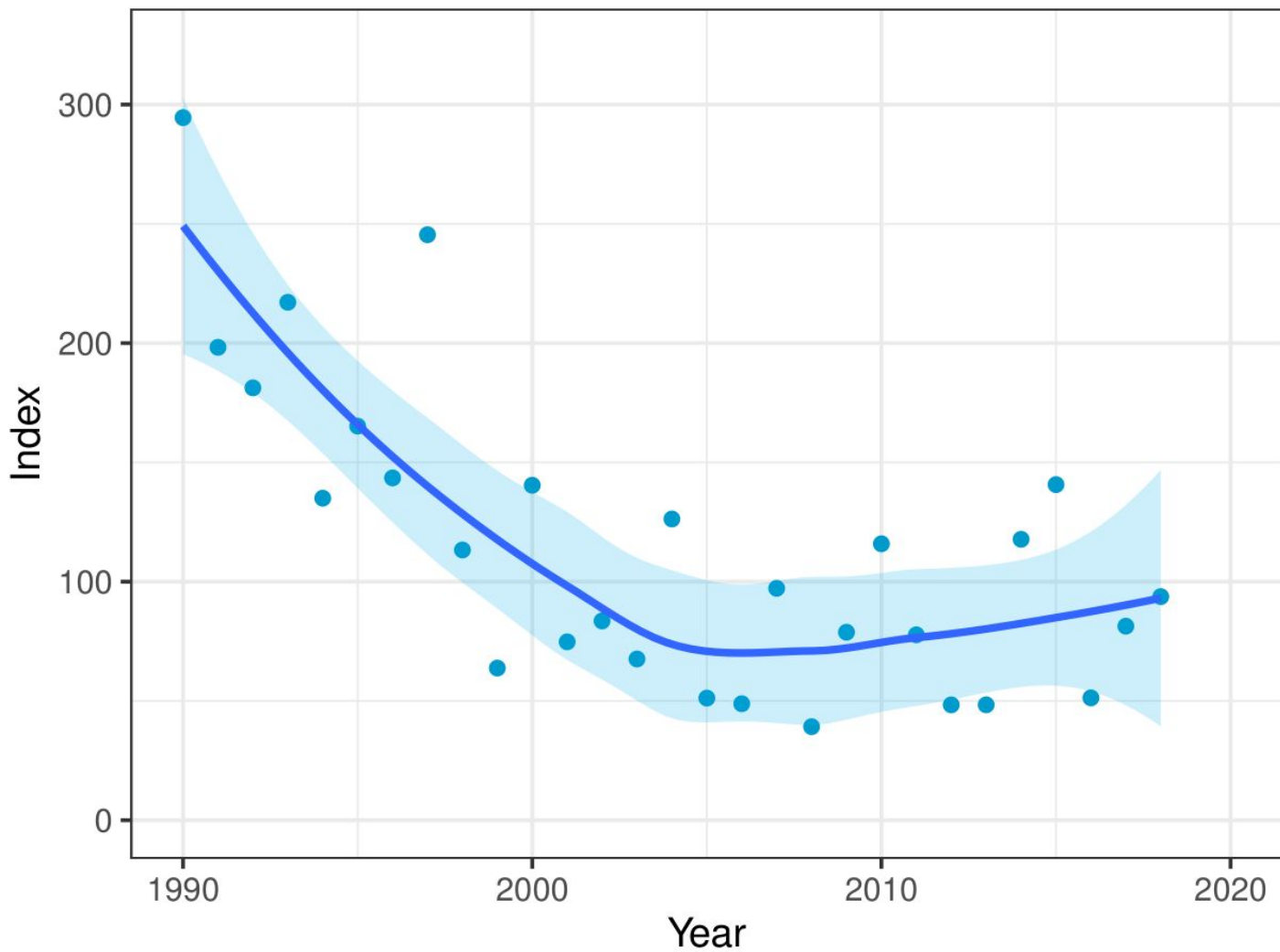
Species declining

Aglais urticae



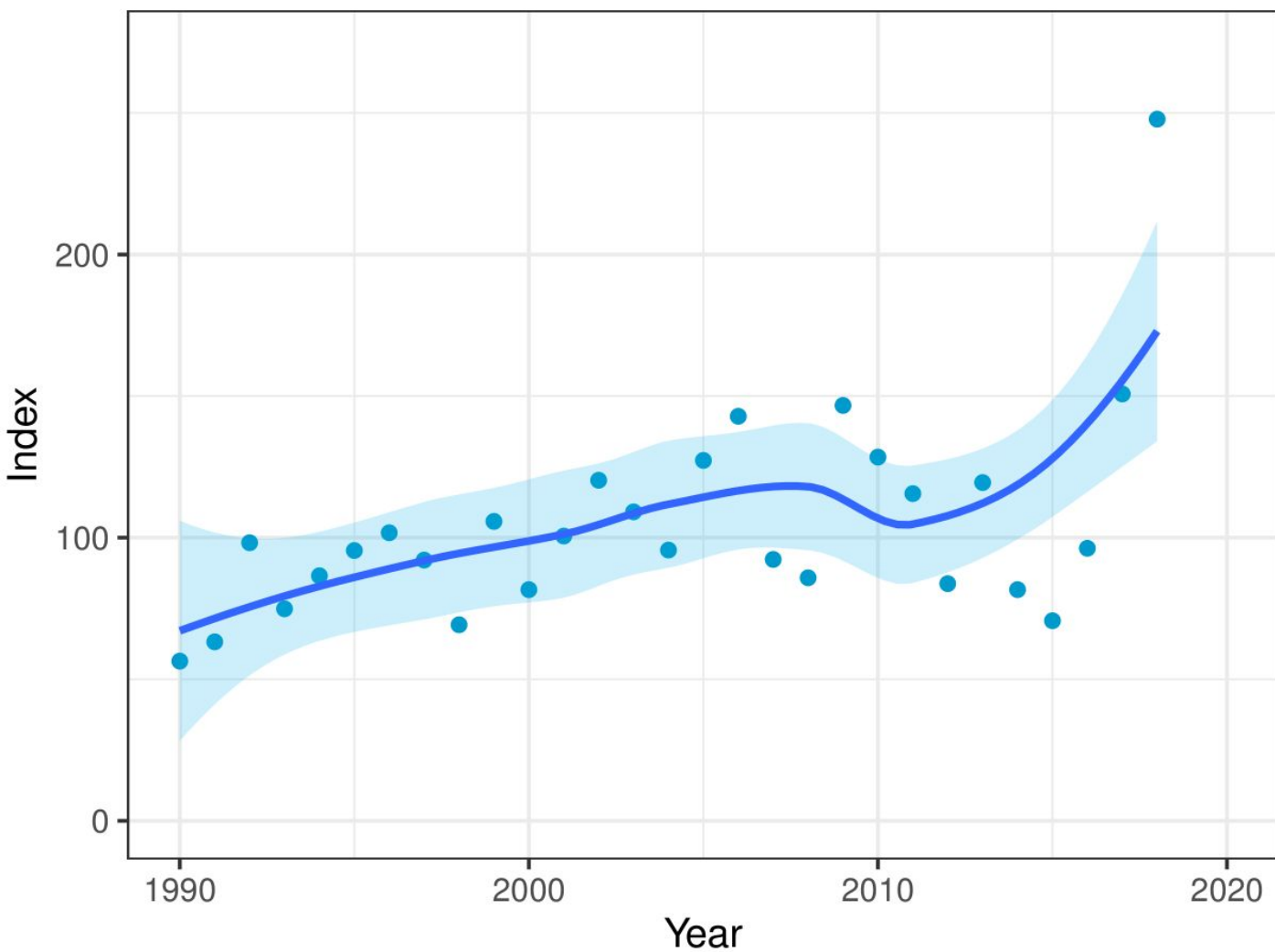
Species declining

Boloria euphrosyne



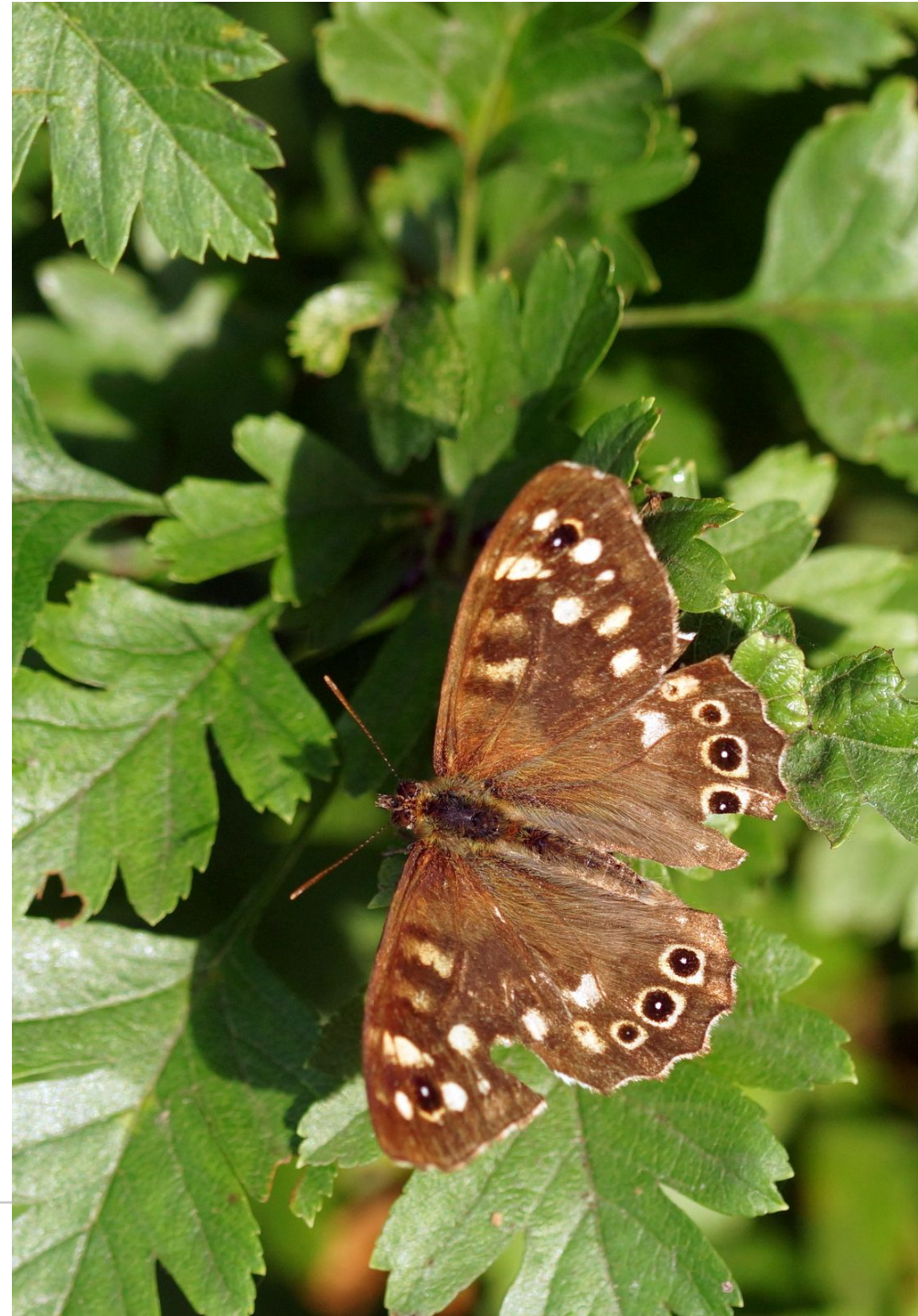
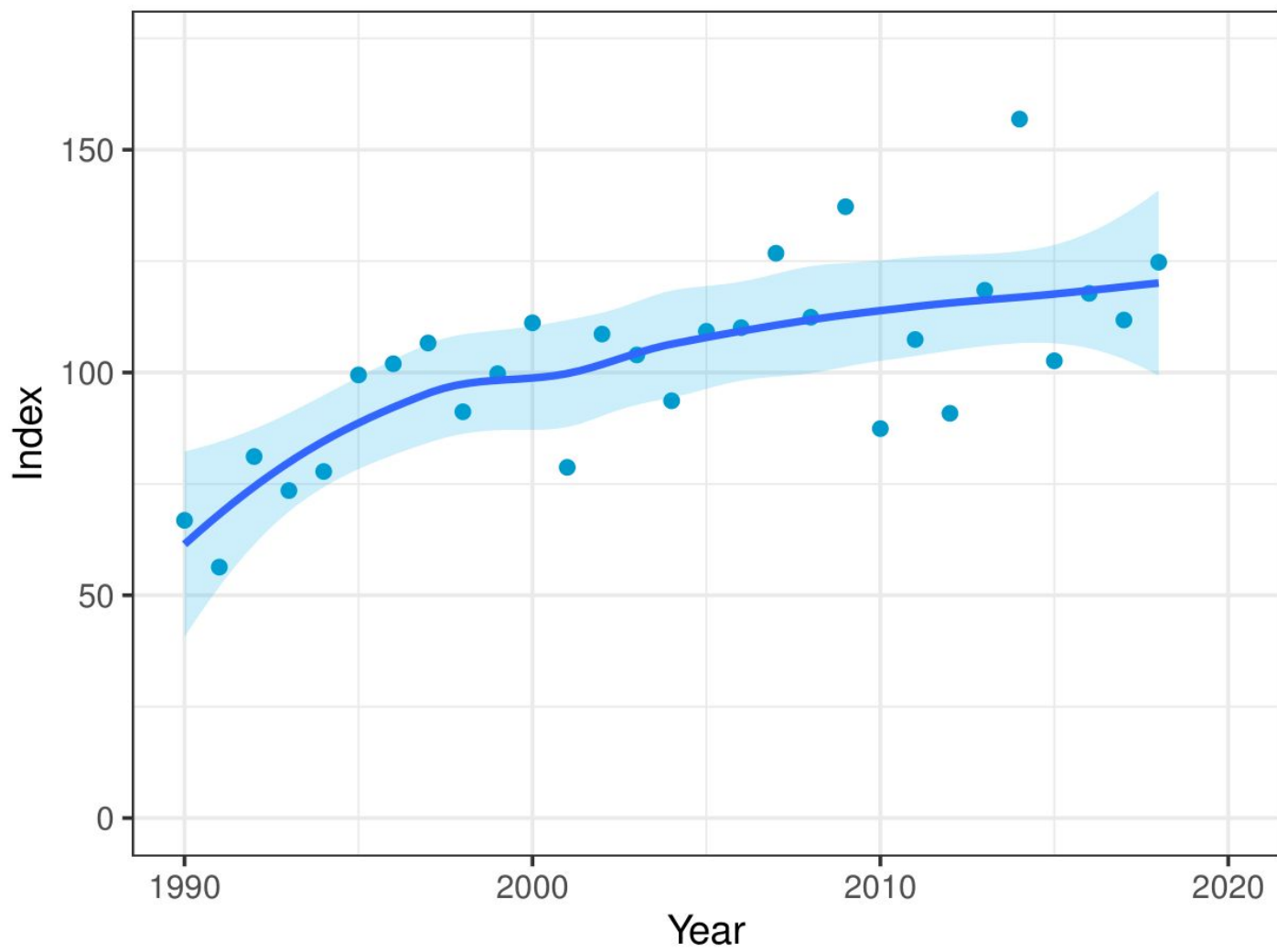
Species increasing

Argynnis paphia



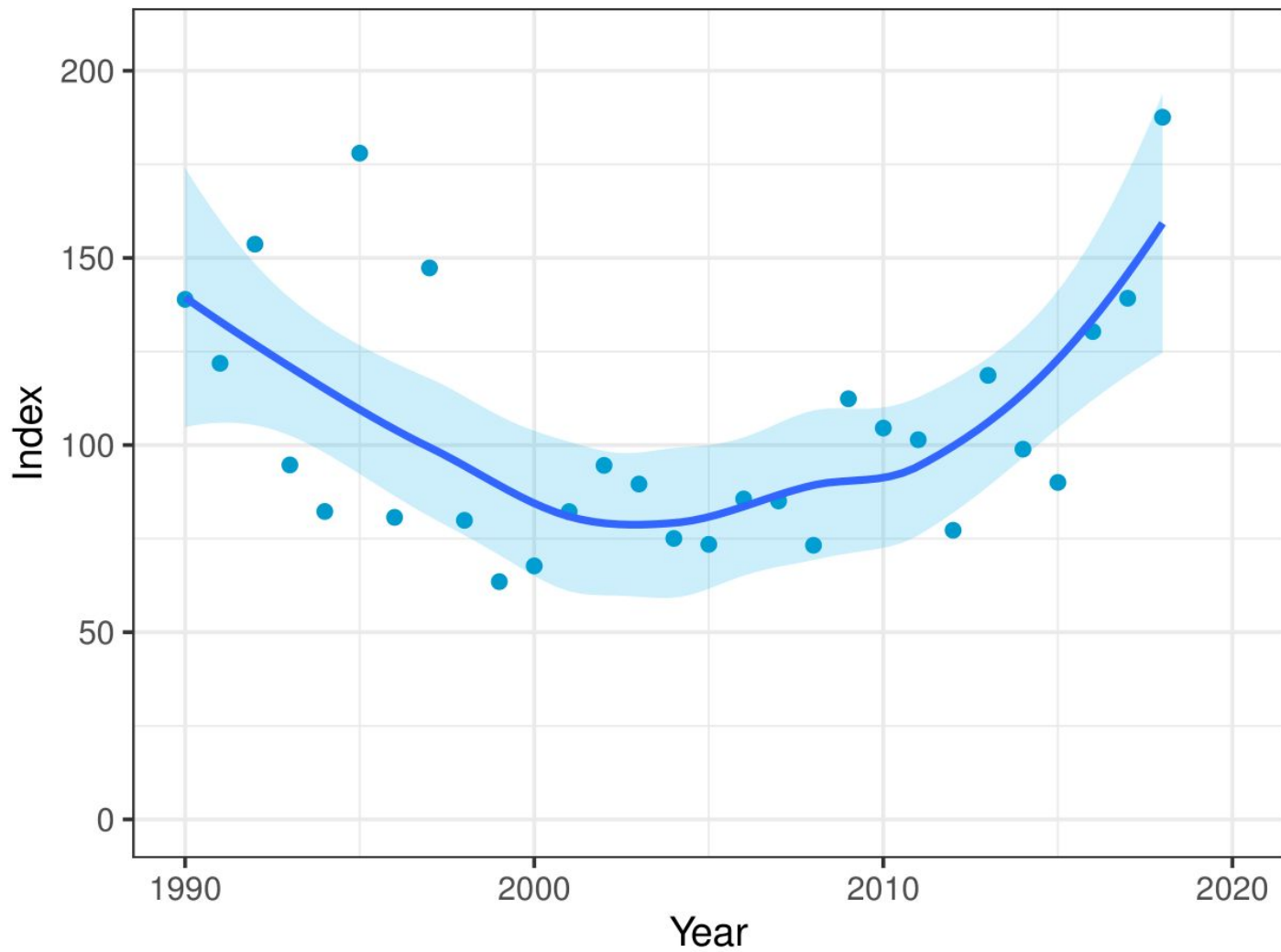
Species increasing

Pararge aegeria



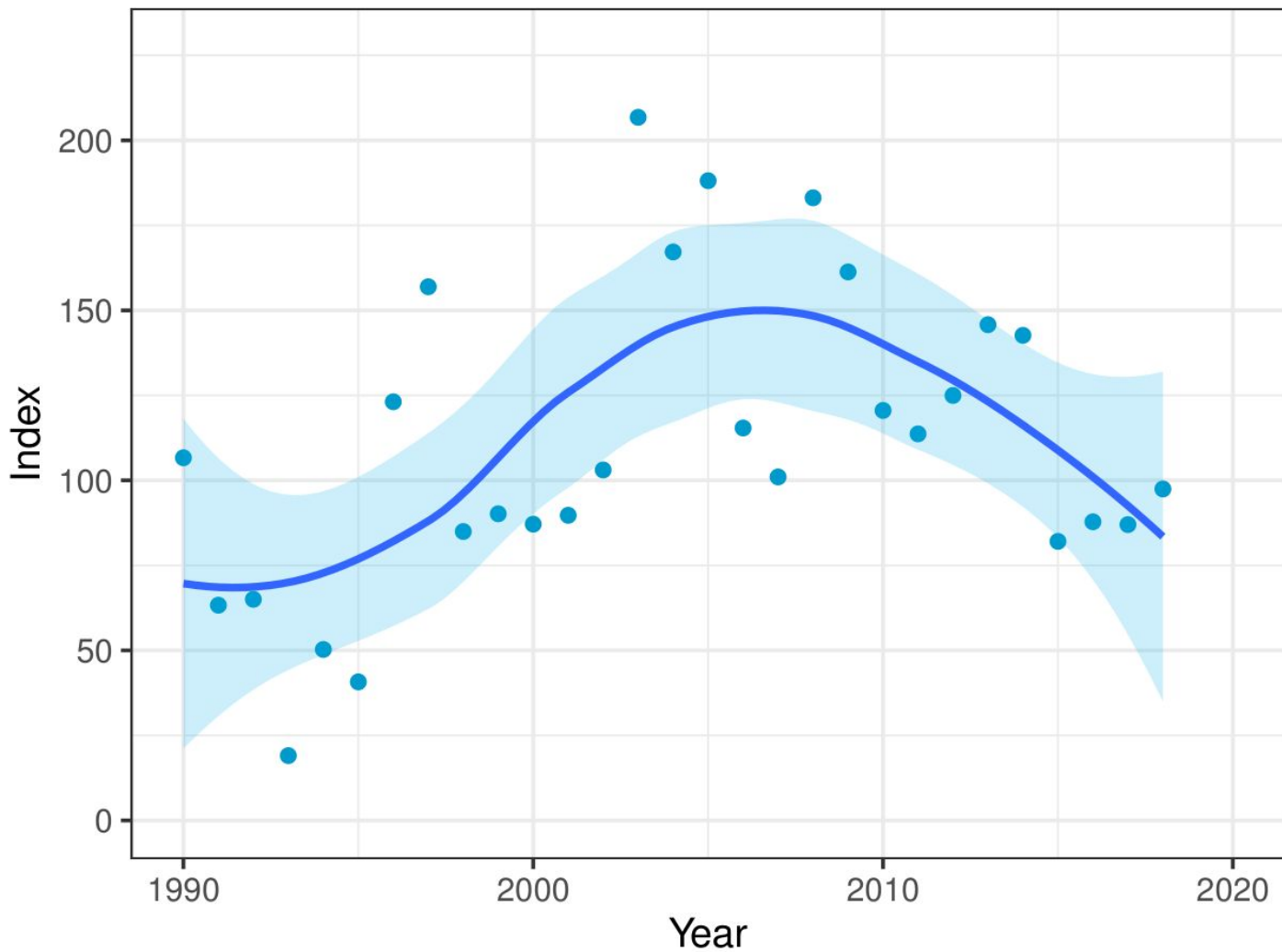
Mixed trends

Issoria lathonia



Mixed trends

Lysandra bellargus

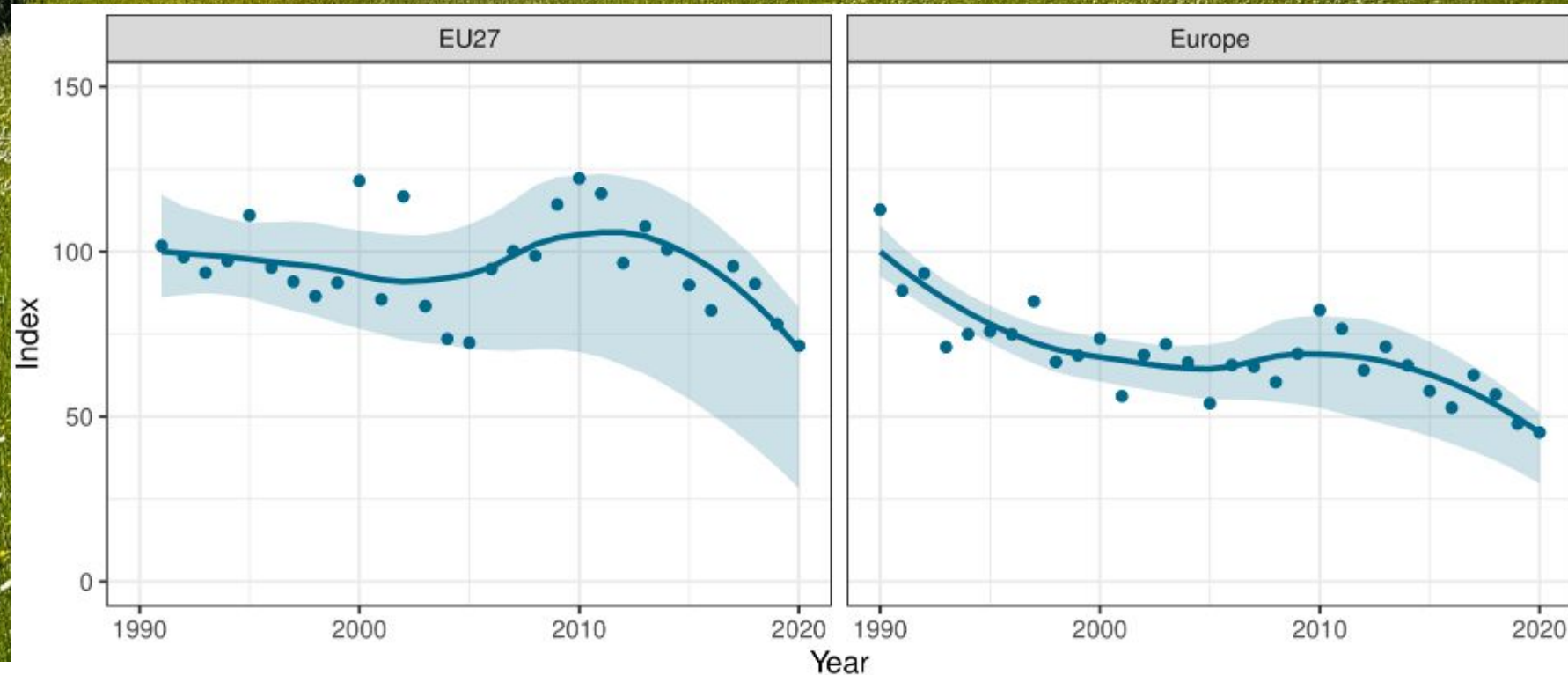


Grassland indicator

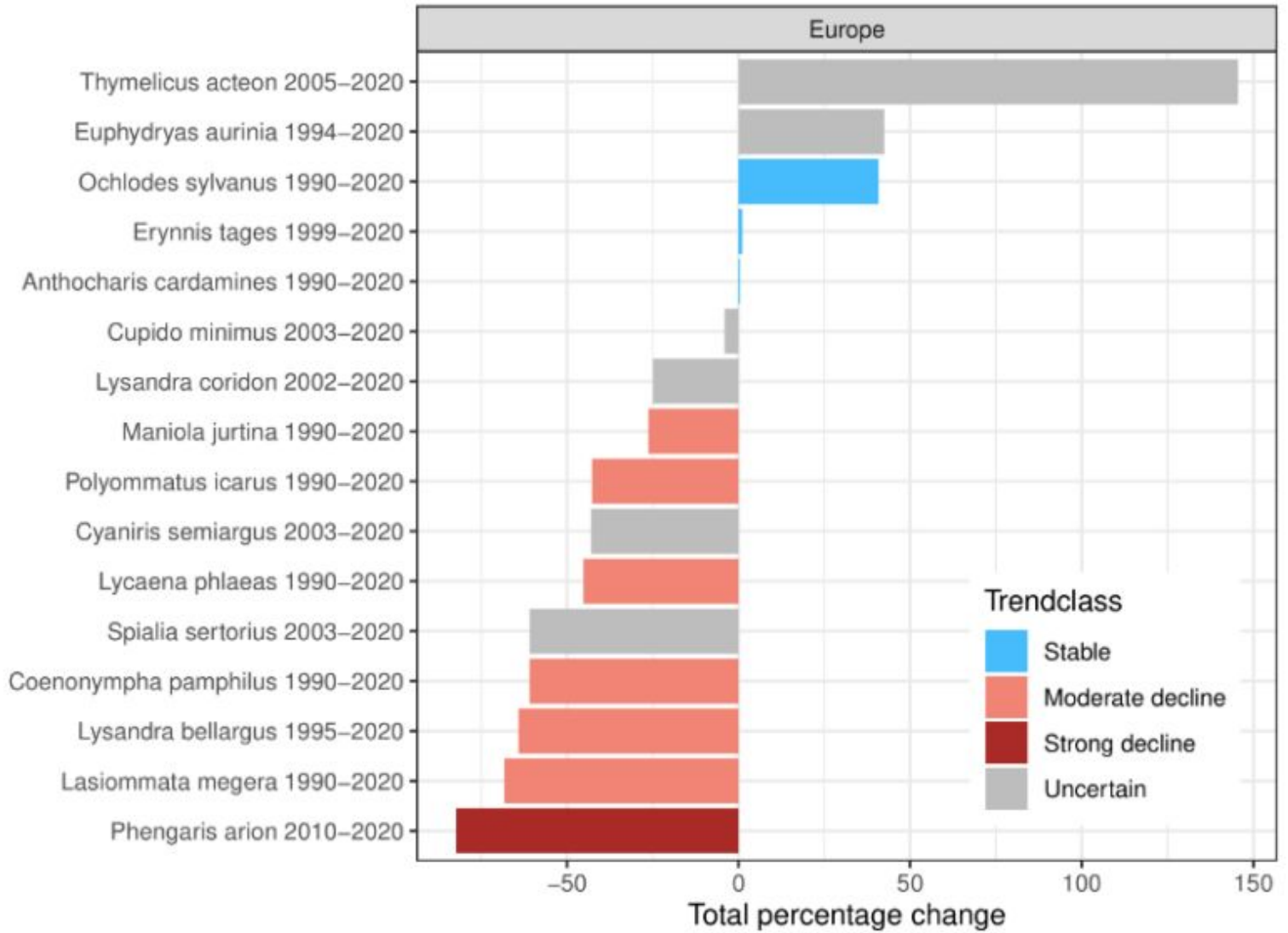


Indicator with data upto 2020

- Grassland butterfly indicator, EU SDG measure
- 17 characteristic grassland butterflies
- Both specialist and widespread species
- 32% decline since 1990 for EU27 (36% for Europe)



Variability between species







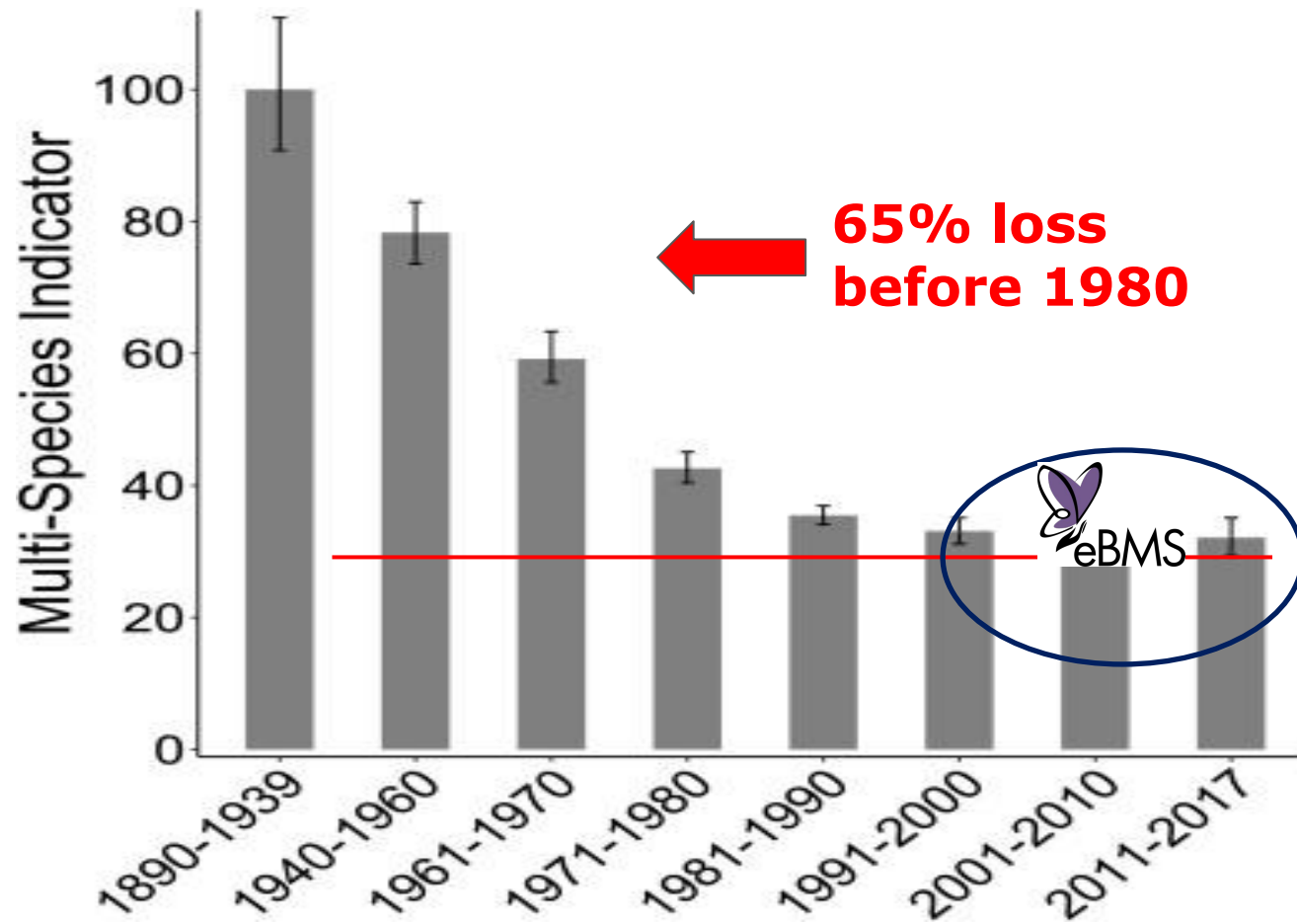


How good are these indicators?

We have an incomplete picture

- Gaps in coverage over the whole continent
 - Corrections for uneven distribution
 - Large gaps, esp. in east and south of Europe
 - Very important: many rare (and often threatened) species missing □ indicators too positive
 - Potential for shifting baselines (we missed the main period of decline)
-

Decline in Netherlands - started early 1900s



- All species indicator based on 5km occupancy (n=71)

Van Strien et al, 2019.
Biol Cons

How good are these indicators?

The only European indicator for insects

- Complimentary to birds
 - Butterflies operate at different spatial scales
 - + very sensitive to botanical composition, structure of vegetation, management, climate change
 - Like birds, big changes occurring
 - Maybe bigger changes to come
 - Vital to keep monitoring
-



Co-ordinators
Volunteers
Chris van Swaay and Martin
Warren for slides



The EU and MEPs for funding and support for the Strengthening Pollinator Recovery through INdicators and monitorinG (SPRING) project

Trends for 167 species, esp. widespread

