The butterfly effect

A Case for Biodiversity using Machine Learning

Capstone Project - Sprint 1 - Mar 8, 2024

What are we looking at?

6,392,186
butterflies sightings

2001 - 2020

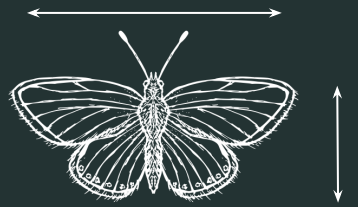
United Kingdom

5,832,272
butterflies sightings

2004 - 2020

United Kingdom

Dataset 1 is merged with:



Dataset 2

Butterflies Traits
(wingspan, flight duration...)

Dataset 3

List of endangered
butterfly species in the UK

WIP:

Dataset 4

External factors
(temperatures, air quality...)

What do we want to predict?

Using a **Time Series model**,

an **estimation of the butterfly population evolution** over the next years

In the context of **climate change**

Why should we care?

The World Economic Forum states that **Biodiversity is 'critically important'** for 5 reasons, as it:

1. Ensures health and food security
2. Helps fight disease
3. Benefits business
4. Provides livelihood
5. Protects us

Why butterflies? The short life cycles are thought to be one of the best indicators of how healthy an environment is

Initial findings

Dataset preprocessing issues

D1 (Sightings)

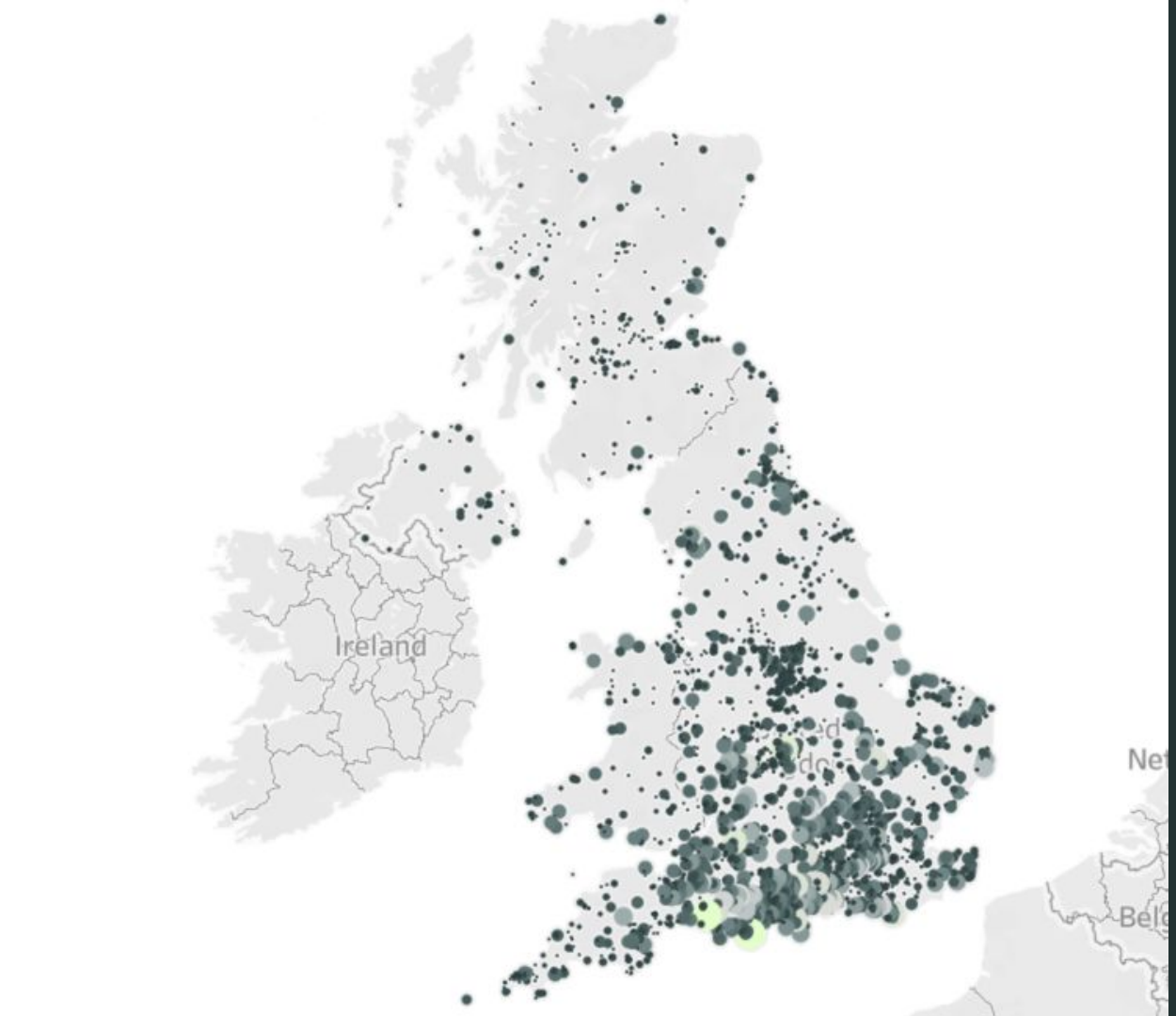
D2 (Traits)

Merging D1 and D2

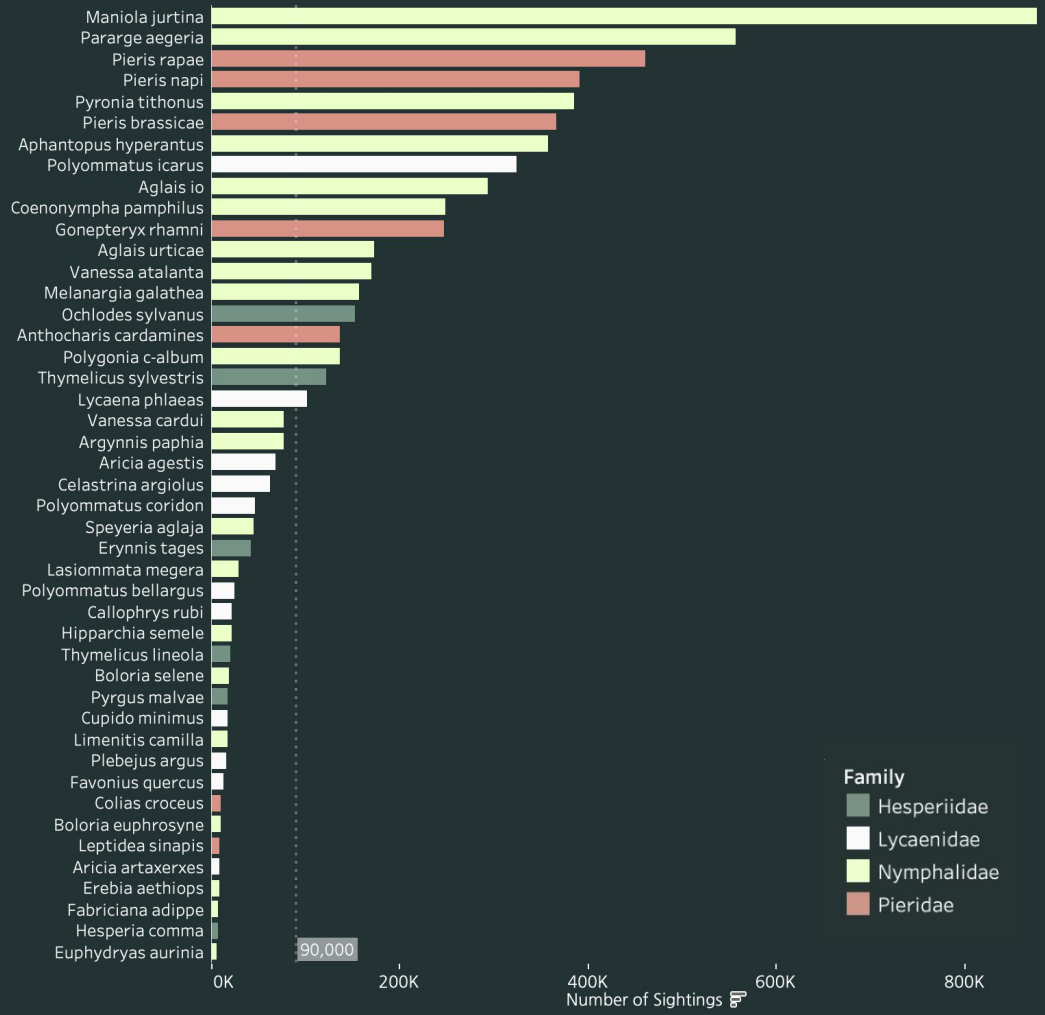
- Key = Species name
- Duplicates in D2
- Missing values in D2

Sightings VS Surveys

- Missing location issues in first dataset
- Finding the number of surveys

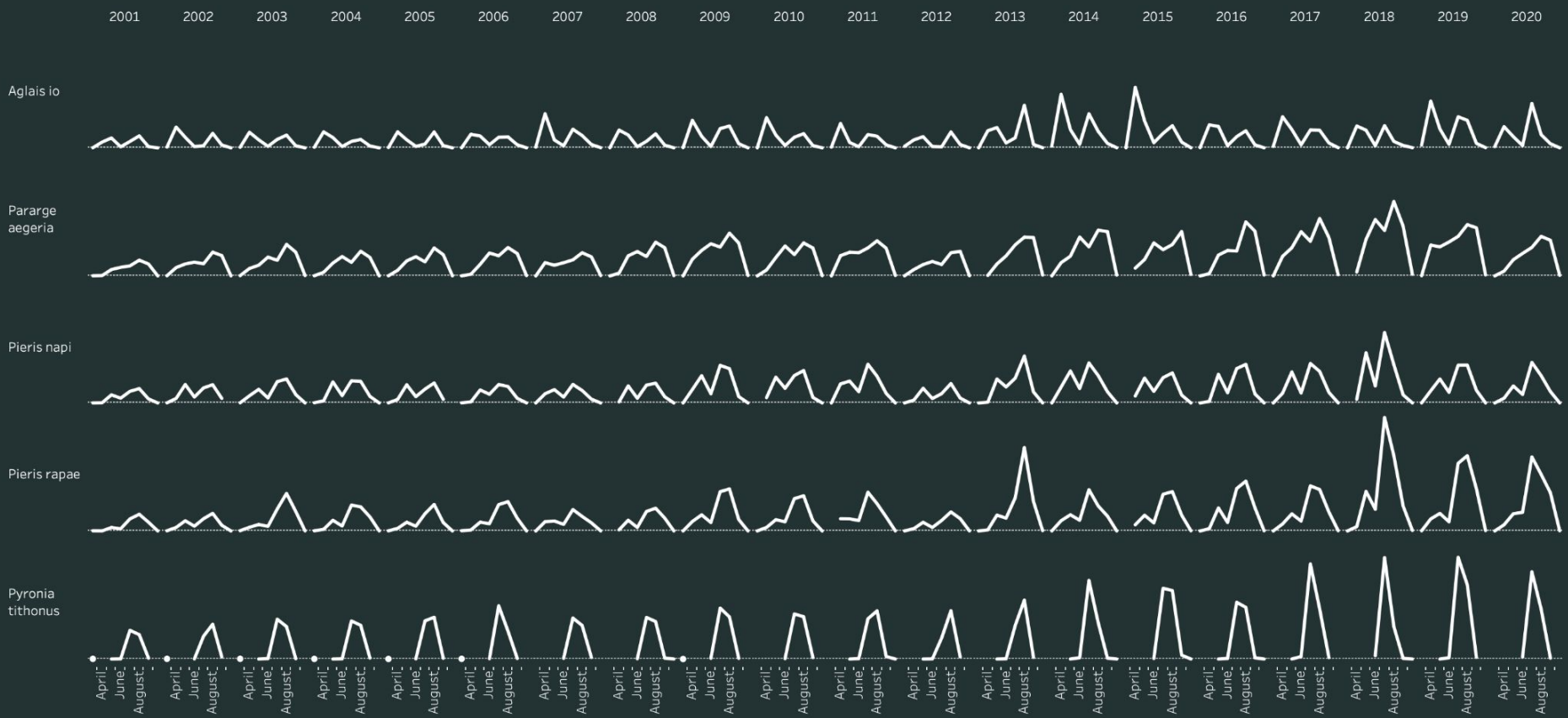


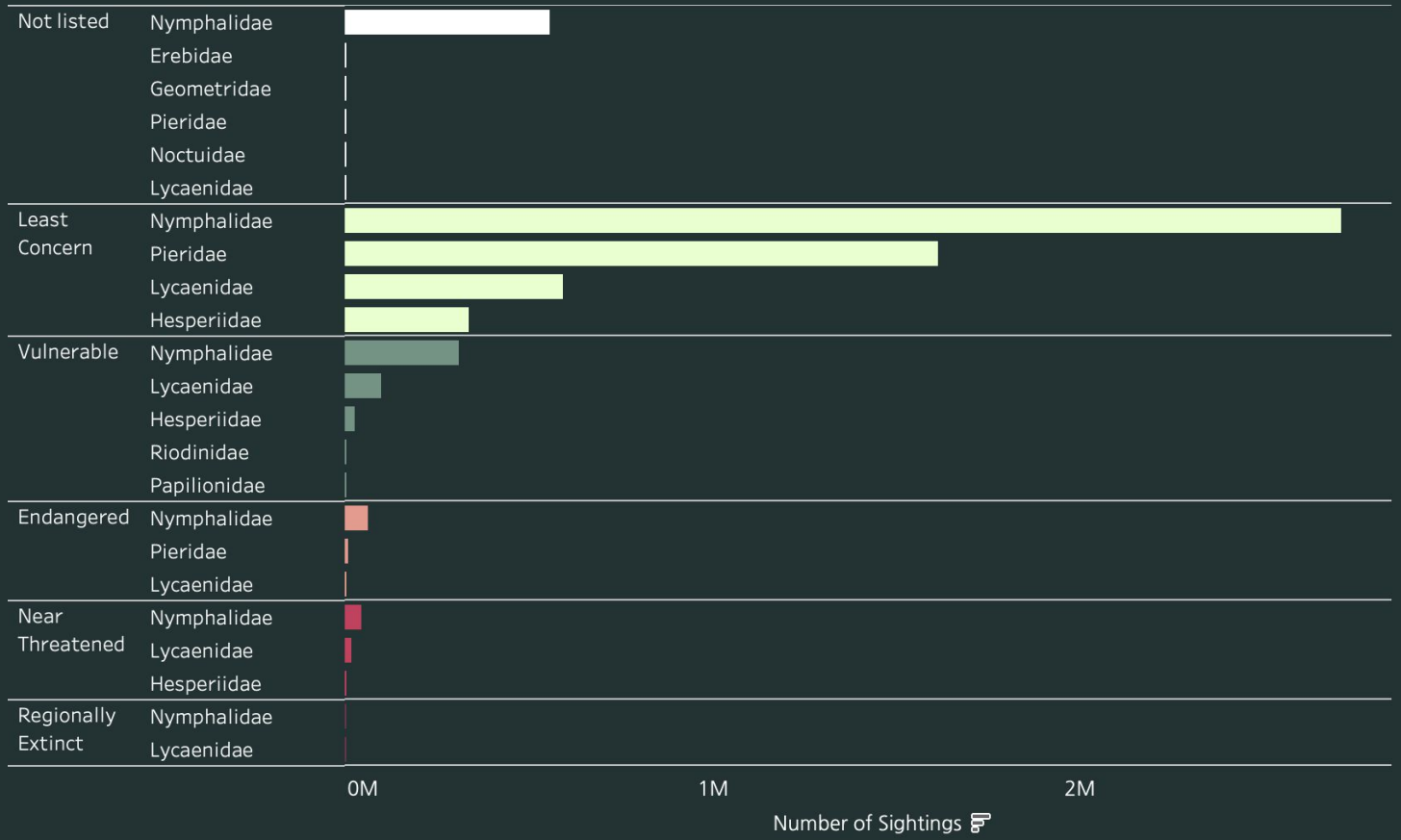
Most of the butterflies sightings in England



We find 71 different butterfly species in the dataset, with an average of 90K sightings per species.

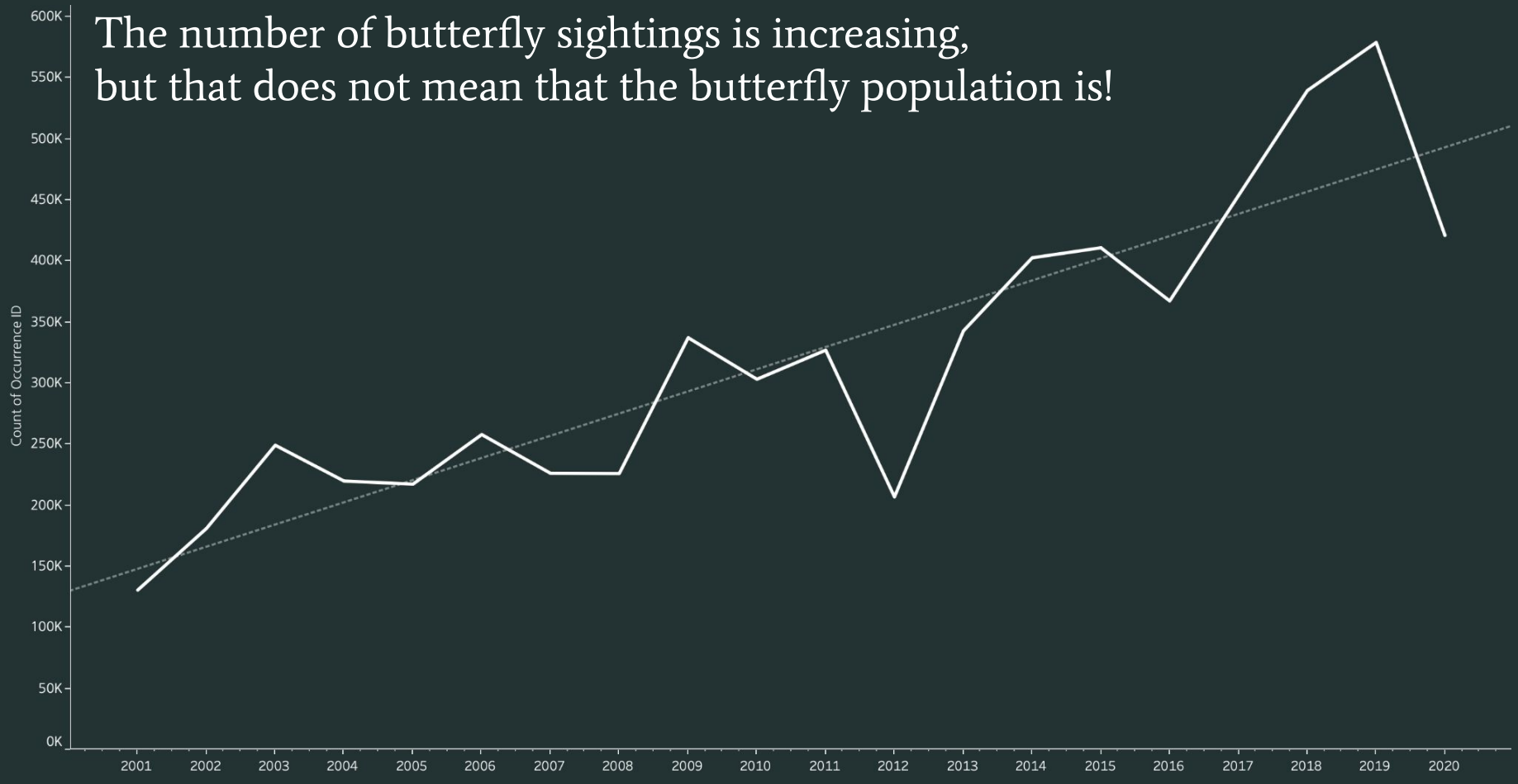
Butterflies sightings and their seasonal pattern for the 5 most seen species

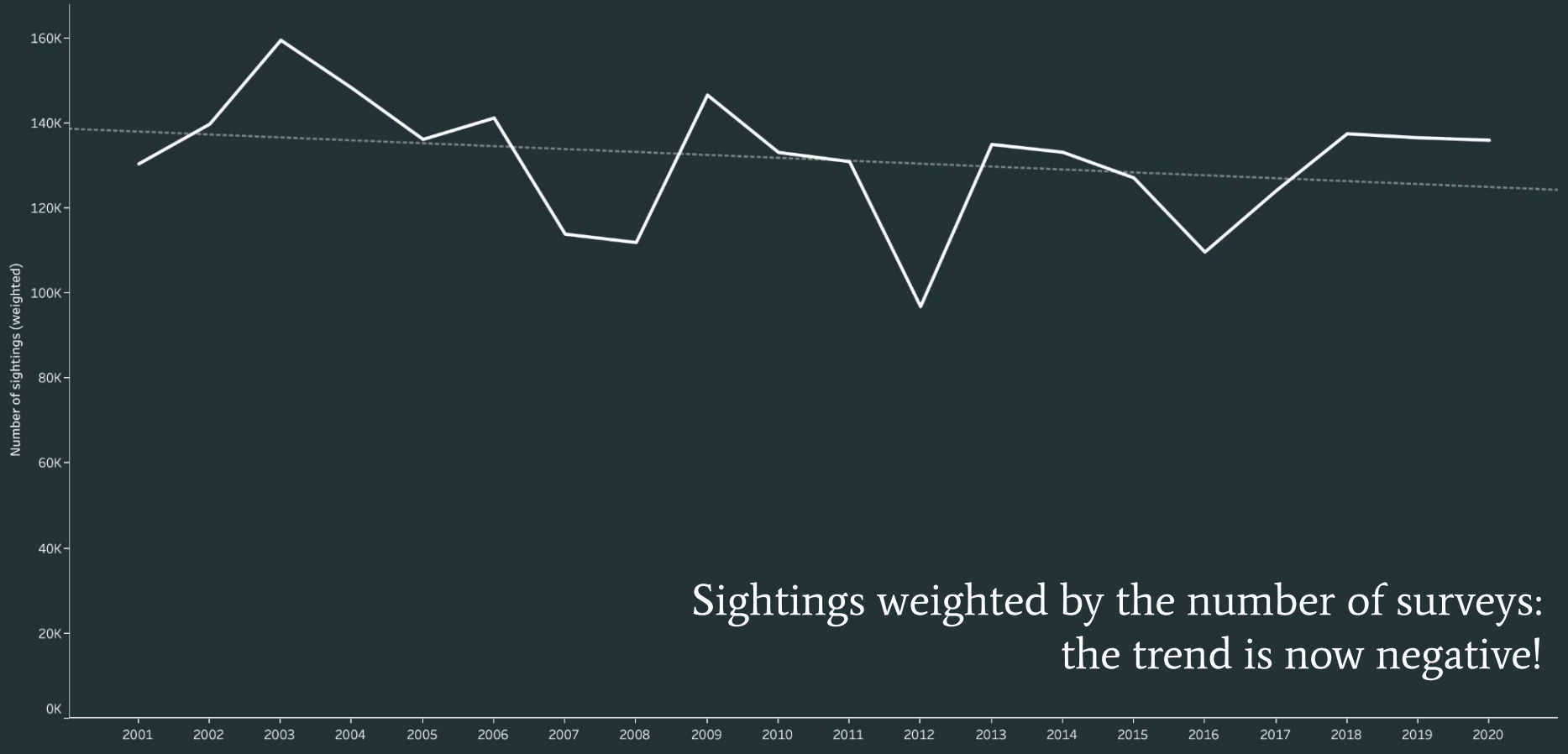



Not listed
Nymphalidae
Erebidae
Geometridae
Pieridae
Noctuidae
Lycaenidae
Least Concern
Nymphalidae
Pieridae
Lycaenidae
Hesperiidae
Vulnerable
Nymphalidae
Lycaenidae
Hesperiidae
Riodinidae
Papilionidae
Endangered
Nymphalidae
Pieridae
Lycaenidae
Near Threatened
Nymphalidae
Lycaenidae
Hesperiidae
Regionally Extinct
Nymphalidae
Lycaenidae
0M
1M
2M
Number of Sightings

Surveys VS Sightings

The number of butterfly sightings is increasing, but that does not mean that the butterfly population is!





Sightings weighted by the number of surveys:
the trend is now negative!

Next steps

Next steps

> Focus on sightings in one location - London

> Time series model: butterfly population evolution predictions

> Understand if and how external factors or Butterfly Traits

impact the evolution historic data and future predictions

Thanks!