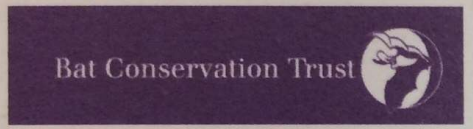
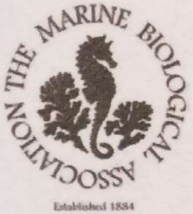
The State of Nature: past, present and future

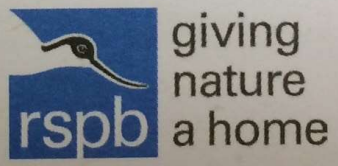
Dr Mark Eaton

Principal Conservation Scientist
RSPB Centre for Conservation Science

The *State of Nature* report is a collaboration between the 25 UK conservation and research organisations listed below:







State of Nature: what is it?

A single authoritative statement on the state of nature, in order to:

- Provide a clear, unified message on the state of the UK's nature
- To promote the activities of partners to monitor and conserve nature

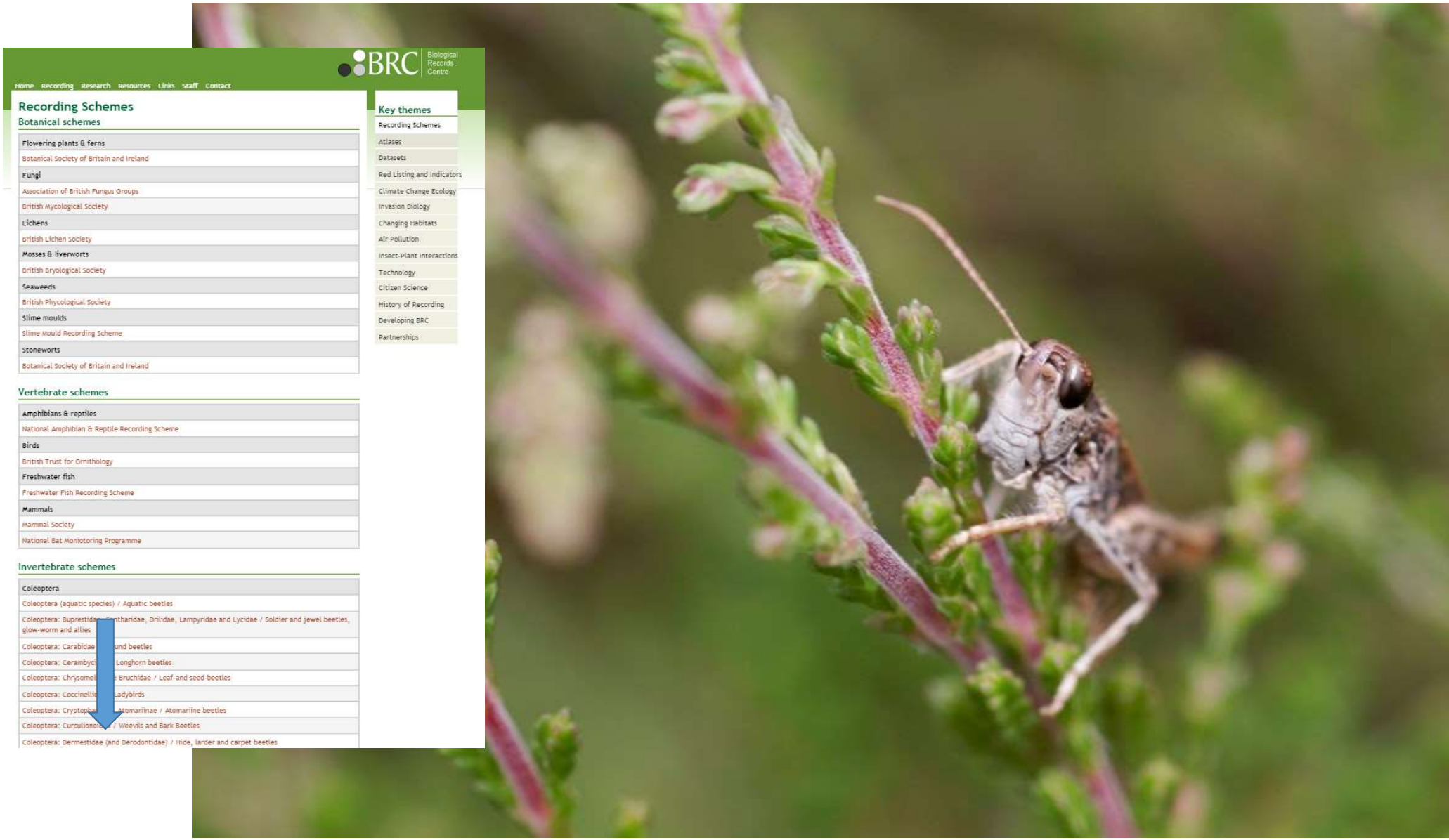
State of Nature: what is it?

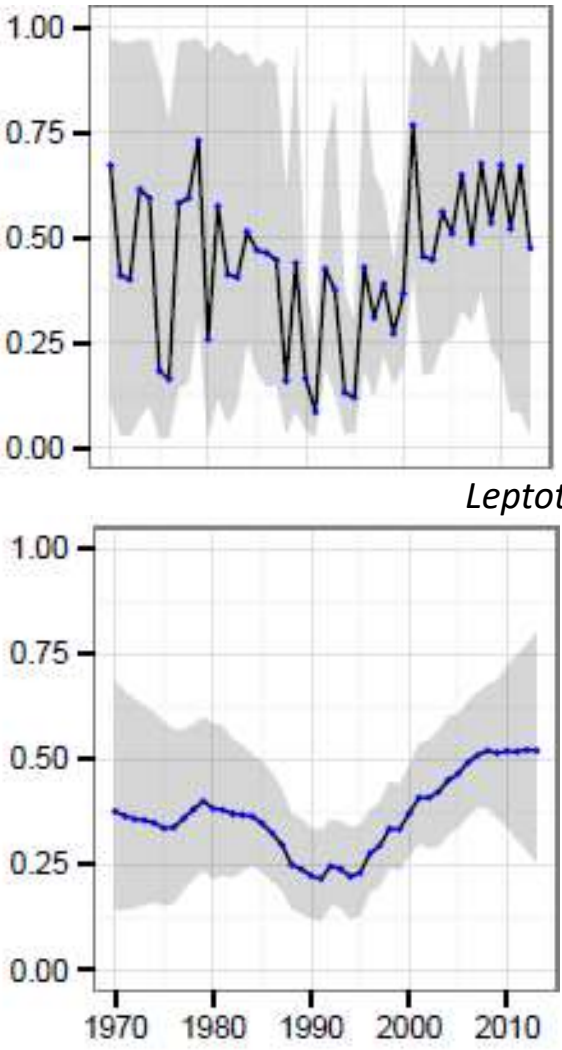
Objective, *not subjective*:

- Based on best available data & expertise
- Focus on species
- Covering all taxonomic groups
- Containing cross-cutting themes
- Not campaigning in tone
- Country-relevant

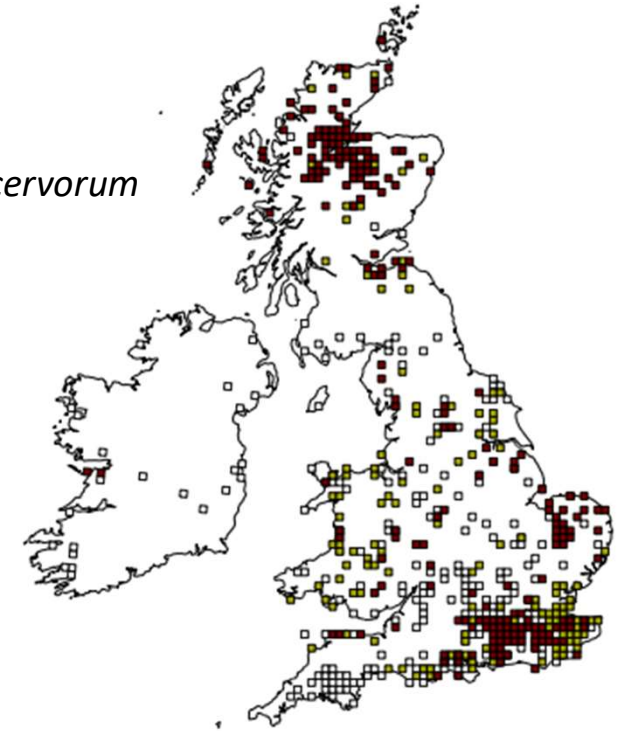
UKBMS

ONLINE ATLAS
OF THE
BRITISH &
IRISH FLORA


BRC
Biological Records Centre
Home Recording Research Resources Links Staff Contact
Recording Schemes
Botanical schemes
Flowering plants & ferns
Botanical Society of Britain and Ireland
Fungi
Association of British Fungus Groups
British Mycological Society
Lichens
British Lichen Society
Mosses & liverworts
British Bryological Society
Seaweeds
British Phycological Society
Slime moulds
Slime Mould Recording Scheme
Stoneworts
Botanical Society of Britain and Ireland
Vertebrate schemes
Amphibians & reptiles
National Amphibian & Reptile Recording Scheme
Birds
British Trust for Ornithology
Freshwater fish
Freshwater Fish Recording Scheme
Mammals
Mammal Society
National Bat Monitoring Programme
Invertebrate schemes
Coleoptera
Coleoptera (aquatic species) / Aquatic beetles
Coleoptera: Carabidae / Ground beetles
Coleoptera: Cerambycidae / Longhorn beetles
Coleoptera: Chrysomelidae / Bruchidae / Leaf-and seed-beetles
Coleoptera: Coccinellidae / Ladybirds
Coleoptera: Curculionoidea / Weevils and Bark Beetles
Coleoptera: Dermestidae (and Derodontidae) / Hide, larder and carpet beetles
Key themes
Recording Schemes
Atlases
Datasets
Red Listing and Indicators
Climate Change Ecology
Invasion Biology
Changing Habitats
Air Pollution
Insect-Plant Interactions
Technology
Citizen Science
History of Recording
Developing BRC
Partnerships



Leptotorax acervorum



- Sampling is biased in time and space
- Detectability is imperfect and uneven
- Effort is unknown

Image: http://formicopedia.org/

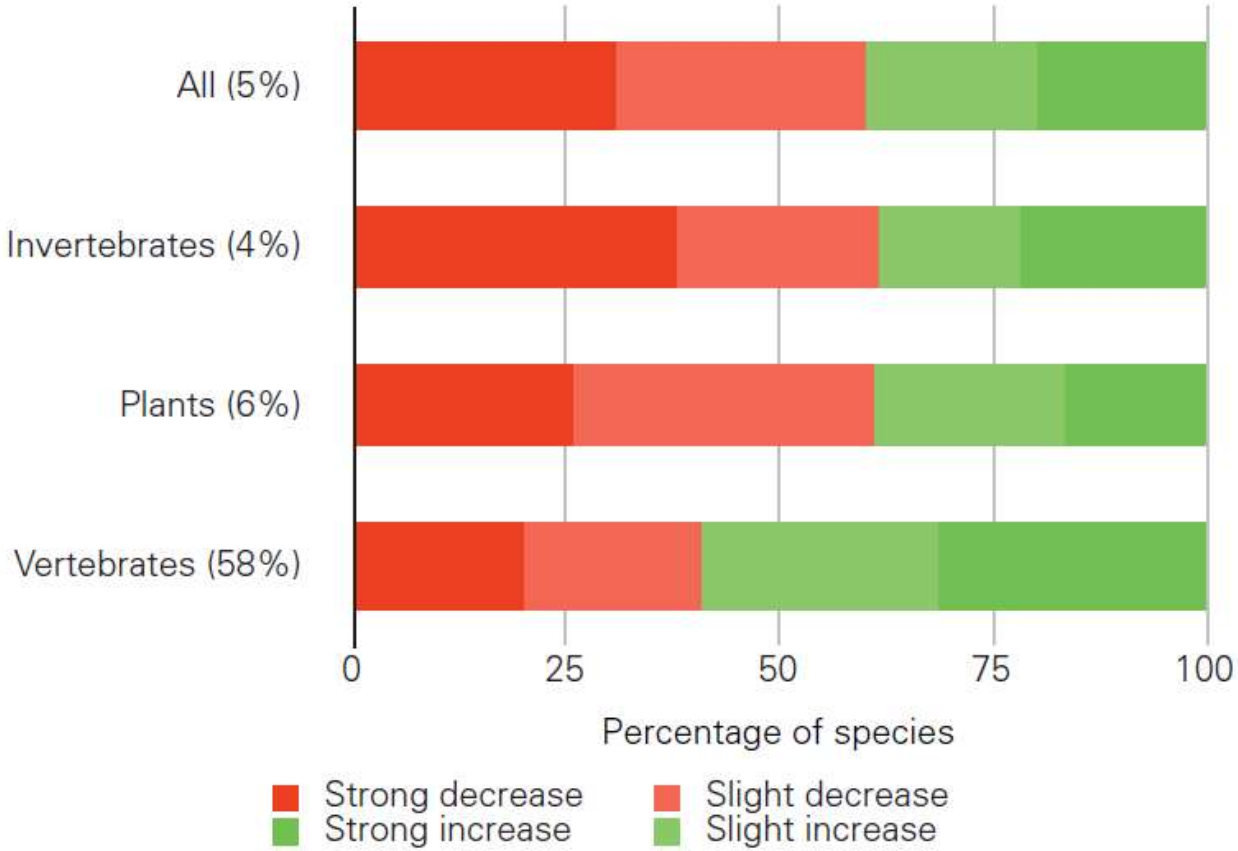
Outhwaite et al (in revision) Ecological Indicators

SoN 2013: what did it tell us?

Species trends

'We have quantitative assessments of the population or distribution trends of 3,148 species. Of these, 60% of species have declined over the last 50 years and 31% have declined strongly.'

SoN 2013: what did it tell us?

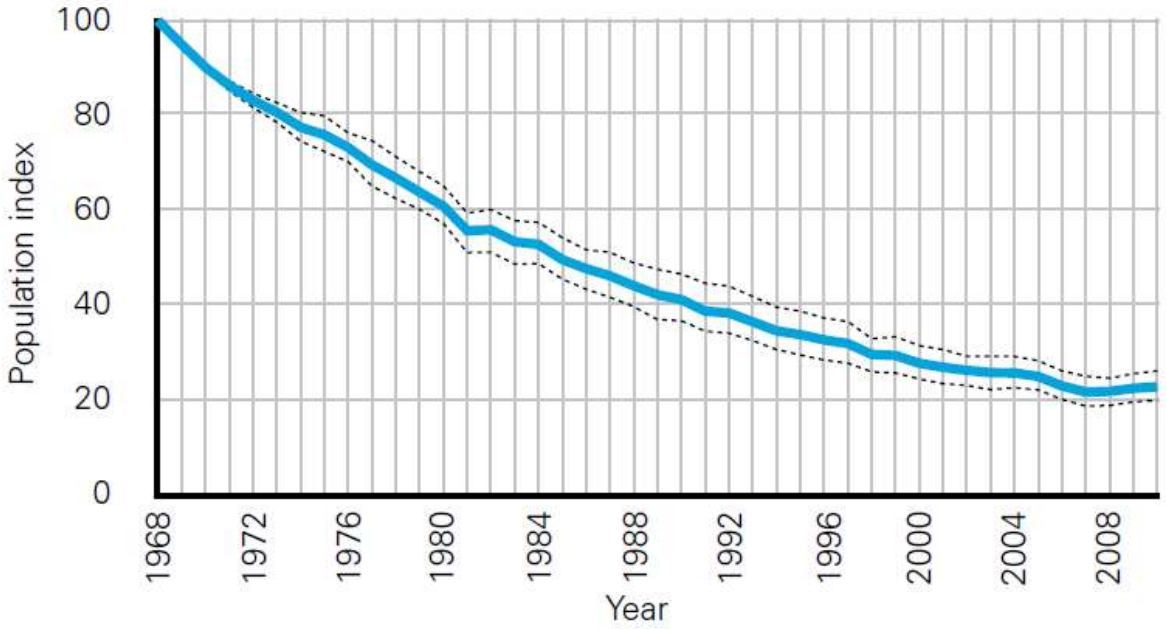


SoN 2013: what did it tell us?

Watchlist Indicator

'A new Watchlist Indicator has been developed to measure how conservation priority species are faring, based on 155 species for which we have suitable data. This group contains many of our most threatened and vulnerable species, and the indicator shows that their overall numbers have declined by 77% in the last 40 years, with little sign of recovery.'

SoN 2013: what did it tell us?



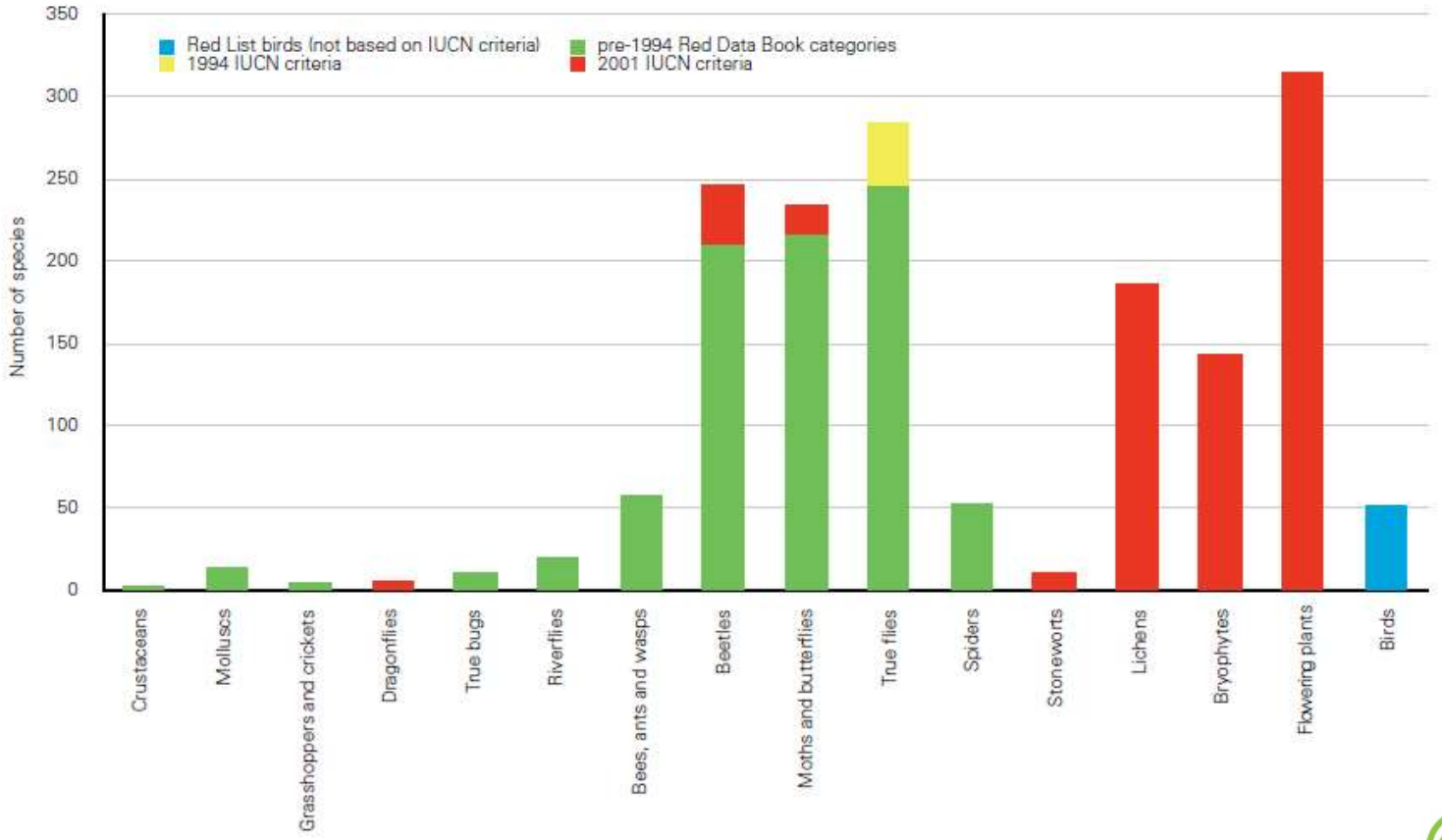
- The indicator starts at 100; a rise to 200 would show that, on average, the populations of indicator species have doubled, whereas if it dropped to 50 they would have halved.
- Dotted lines show the 95% confidence limits, which were generated by bootstrapping the species level trends.

SoN 2013: what did it tell us?

National Red Lists

'Of more than 6,000 species that have been assessed using modern Red List criteria, more than one in ten are thought to be under threat of extinction in the UK. A further 885 species are listed as threatened using older Red List criteria or alternative methods to classify threat.'

SoN 2013: what did it tell us?



Setting th

The *State of Natur* the fortunes of t This time frame to focus on what is hap was also dictated by th of wildlife in the UK dic

Where possible, we ha the 1960s, but for mar trends over a much sh that many of the most landscape and wildlife our study period, so it changes in the context

Historical changes such and the 17th century a huge impact on our about these ancient e the last two centuries, is better and the report to flourish. During this the loss and modificati the corresponding loss These are some of the

- *The area of lowland by 97% between th 64,000 sq km. A hu were affected, inclu cuckoo bee (Norna*
- *The area of coppice 1900 to 1970², wit such as fritillary bu* (Chelostoma semifas bee (Osmia pilicorn *that once carpeted*

Bog bush cricket

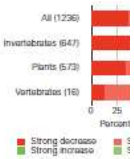
The state and heathl

The amount of low semi-natural gras declined by 97% the 1930s and 1984, w heathland has shrunk i 80% since 1800[3,4], with continuing through the 1990s[4]. In Derbyshire, 80–91% of semi-natura was lost between 1984 Loss of habitat on this corresponding national species strongly associ heathland, including th warbler, silver-studded smooth snake, mottled lobelia and small red da on grassland there wer declines in the silver-sp marsh fritillary, whinch bush cricket), green-wi field gentian, amongst

The burnt orchid, a calca specialist, has been lost and many of the special and limestone maintain existence over much of today. Several species these habitats have be including the short-hair and starry breck lichen.

65% of the semi-natura heathland species for w data have declined (see

Figure 9
The proportion of lowland grassland and heathland are increasing or decreasi taxonomic group, measur population size or range of up to 60 years. The valu represent the number of



Why is low and heathl

Agricultural impr including ploug re-seeding and was the major cause of species loss on grassla 1990s[4]. Heathland was by urban development, extraction and afforest Recent declines in the

Example
Both under- and over-gr lead to less structural a habitat variety, as well a loss of associated invert and plant species, such ground-living lichens.

Habitat deterior

Example
Small, isolated sites lose populations far more quickly than large, connected sites. Sand lizards and other reptiles are declining in the Wealden Heaths because the sites are fragmented.

Human disturb

Example
Heathland birds are less successful where human disturbance, especially walking, is high, and in proximity to urban area

Case study

Understandin potential impa ash dieback

Ash tree

Chalara dieback is a se ash trees caused by th fraxinea (more correct Hymenoscyphus pseu which has caused wide to European ash tree p disease was unknown i until the first cases wer a tree nursery in Buckin early 2012. By Octobe confirmed in mature a currently underway to far the disease has spre

Ash trees are an impor of our native woodland they are a common hea and the third most com broadleaved woodland 13% of trees. Across they account for 5% of important for fungi, in need deadwood, and e and bryophytes, altho are totally reliant on a ash trees, with their ass and hollows, also prov nesting sites for many birds, as well as roostin Ash-dominated woodla be rich in plants, as the than oak woods, and t on lime-rich soils.

At this stage, it is very what impact the diseas woodland in the UK. W losses both directly, as and habitat loss, and i the loss of associated However, the increased diversity of deadwood be beneficial in some c

UK

Wales

state of nature

SoN 2013: key messages

- A single voice
- Nature is amazing
- Pressures upon nature
- Loss of nature
- We can turn it around
- Power of partnership
- Value of volunteers

Burns *et al* (2013) The state of nature

The *State of Nature 2016* report is a collaboration between the UK conservation and research organisations listed below:

state of nature

rspb.org.uk/stateofnature

SoN 2016: what does it tell us?

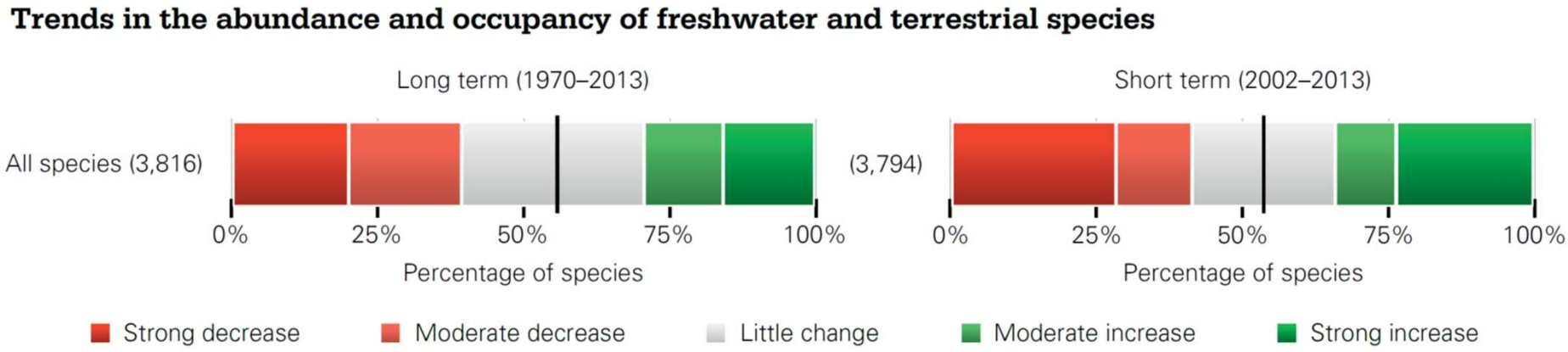
Species trends

'Between 1970 and 2013, 56% of species declined, with 40% showing strong or moderate declines. 44% of species increased, with 29% showing strong or moderate increases. Between 2002 and 2013, 53% of species declined and 47% increased.'

'These measures were based on quantitative trends for almost 4,000 terrestrial and freshwater species in the UK.'

state of nature

SoN 2016: what does it tell us?



SoN 2016: what does it tell us?

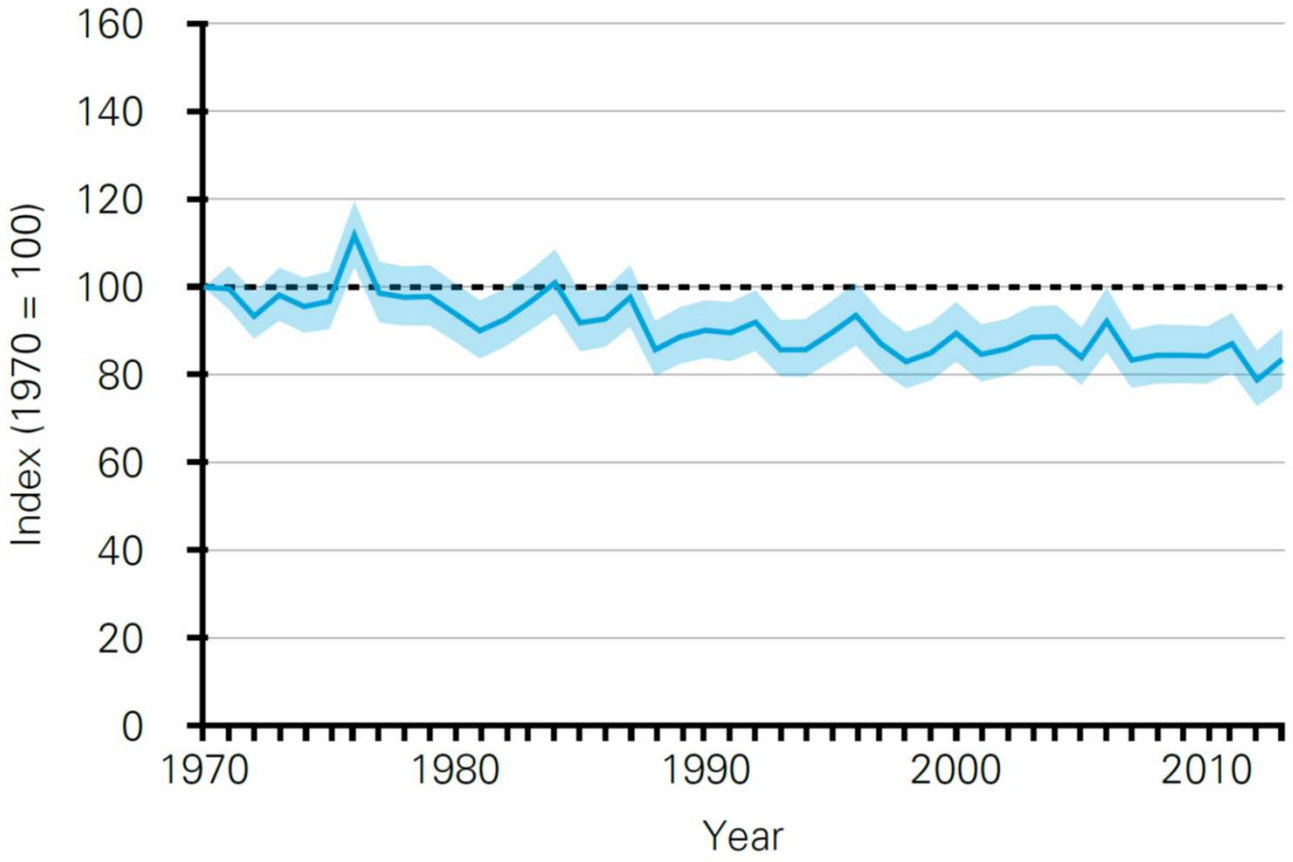
More species trends

'An index of species' status, based on abundance and occupancy data, has fallen by 16% since 1970. Between 2002 and 2013, the index fell by 3%.'

'There was no significant difference in the rate of change between the long and short term.'

'This is based on data for 2,501 terrestrial and freshwater species in the UK.'

SoN 2016: what does it tell us?



SoN 2016: what does it tell us?

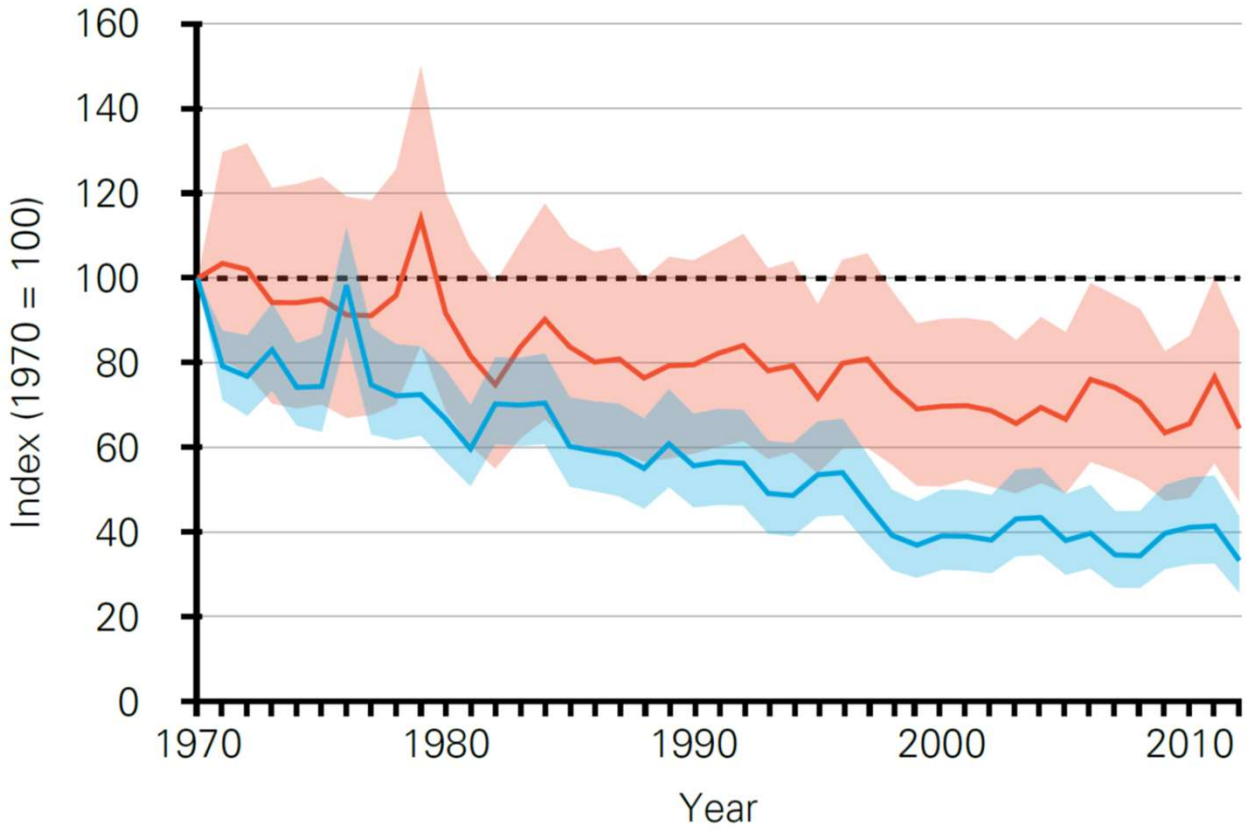
'An index describing the abundance of species of special conservation concern in the UK has fallen by 67% since 1970, and by 12% between 2002 and 2013.'

'The measure based on occupancy has fallen by 35% since 1970, and by 6% between 2002 and 2013.'

'These are based on trend information for 213 (abundance) and 111 (occupancy) priority species.'

state of nature

SoN 2016: what does it tell us?

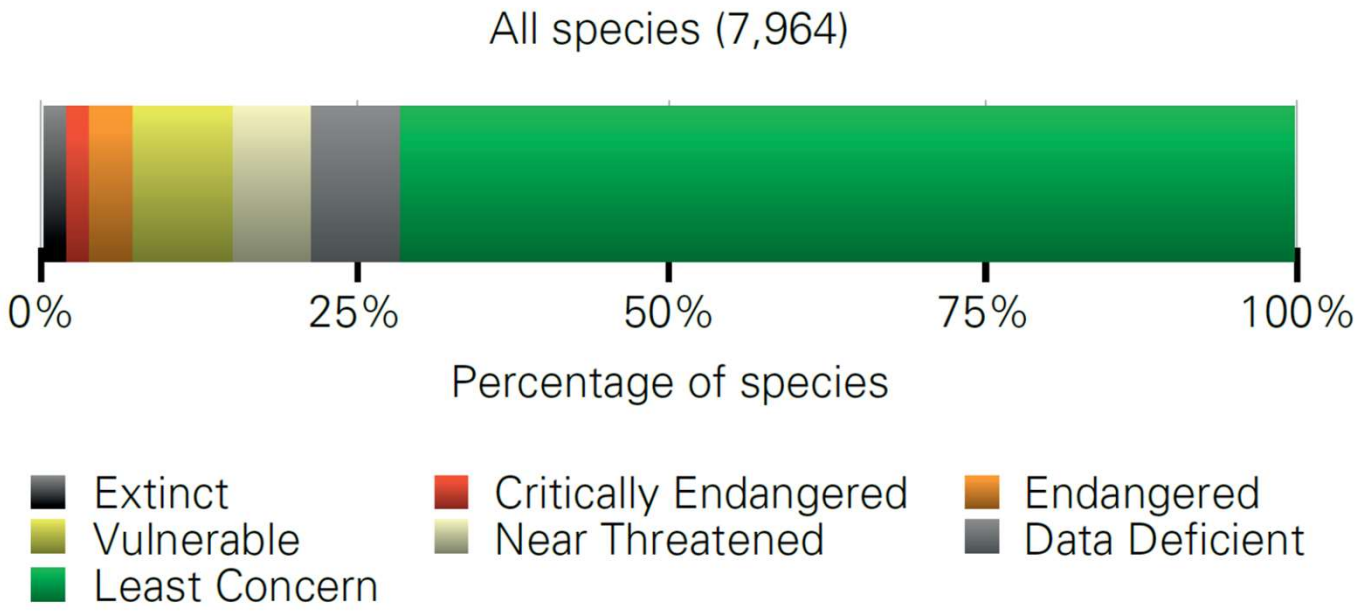


SoN 2016: what does it tell us?

National Red Lists

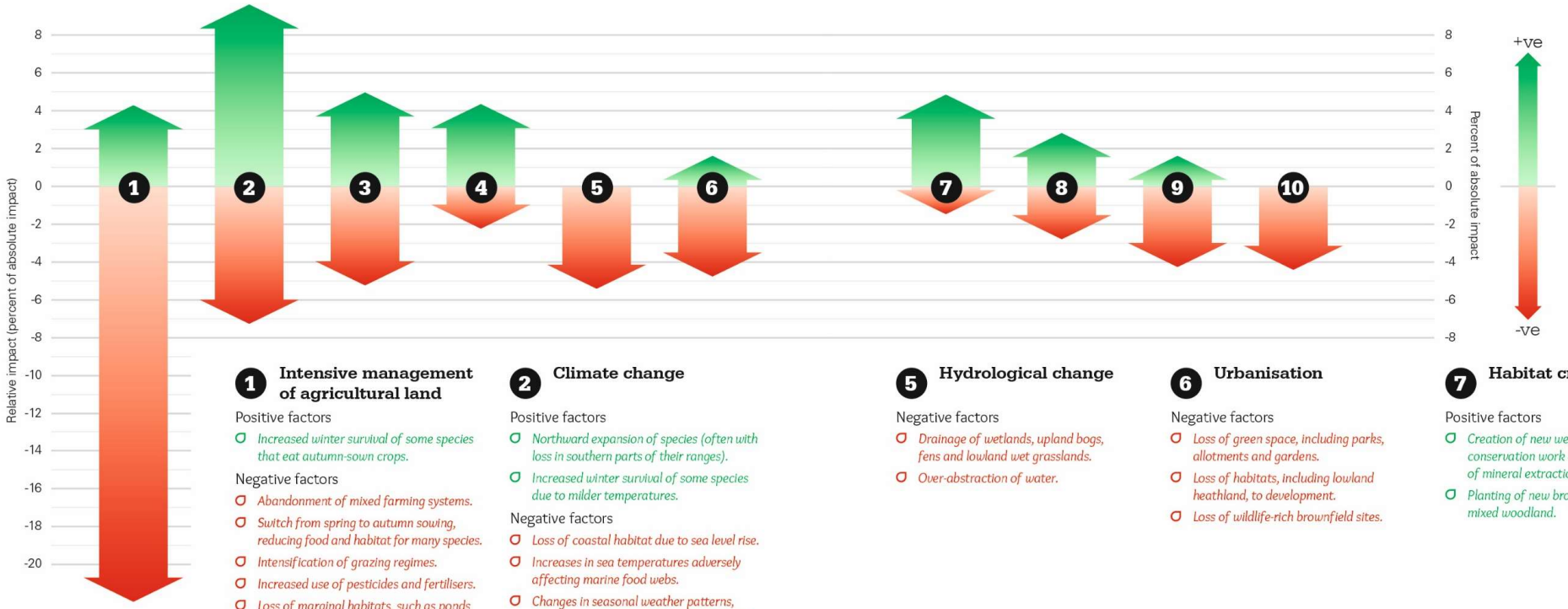
'Of the nearly 8,000 species assessed using modern Red List criteria, 15% are extinct (2%) or threatened with extinction (13%) from Great Britain.'

SoN 2016: what does it tell us?



Burns et al (2016) PLoS ONE 11: e0151595

Why is nature changing in the UK?



1 Intensive management of agricultural land

Positive factors
- Increased winter survival of some species that eat autumn-sown crops.

Negative factors
- Abandonment of mixed farming systems.
- Switch from spring to autumn sowing, reducing food and habitat for many species.
- Intensification of grazing regimes.
- Increased use of pesticides and fertilisers.
- Loss of marginal habitats, such as ponds and hedgerows.

2 Climate change

Positive factors
- Northward expansion of species (often with loss in southern parts of their ranges).
- Increased winter survival of some species due to milder temperatures.

Negative factors
- Loss of coastal habitat due to sea level rise.
- Increases in sea temperatures adversely affecting marine food webs.
- Changes in seasonal weather patterns, such as winter storms and wetter springs.

3 Low-intensity management of agricultural land

Positive factors
- Introduction of wildlife-friendly farming through agri-environment schemes.

Negative factors
- Abandonment and reduced grazing, leading to the loss of some habitats.

4 Increasing management of other habitats

Positive factors
- Conservation management, often by reinstating traditional methods.

Negative factors
- Increased grazing pressure.

5 Hydrological change

Negative factors
- Drainage of wetlands, upland bogs, fens and lowland wet grasslands.
- Over-abstraction of water.

6 Urbanisation

Negative factors
- Loss of green space, including parks, allotments and gardens.
- Loss of habitats, including lowland heathland, to development.
- Loss of wildlife-rich brownfield sites.

7 Habitat creation

Positive factors
- Creation of new wetlands through conservation work and as a by-product of mineral extraction.
- Planting of new broadleaved and mixed woodland.

8 Increasing plantation forest area

Positive factors
- Increased habitat area for species using coniferous plantations and woodland edges.

Negative factors
- Loss of the habitat that plantations replace, particularly lowland heaths and upland habitats.

9 Decreasing forest management

Negative factors
- Cessation of traditional management practices, such as coppicing, leading to the loss of varied age structure and open habitats within woodland.

10 Decreasing management of other habitats

Negative factors
- Abandonment of traditional management, including grazing, burning and cutting, which is crucial for the maintenance of habitats such as heathland and grassland.

The figure shows the most significant drivers of change in our nature. Green arrows show positive impacts; red arrows show negative impacts. For full details and further results, see tinyurl.com/j8rxyyl

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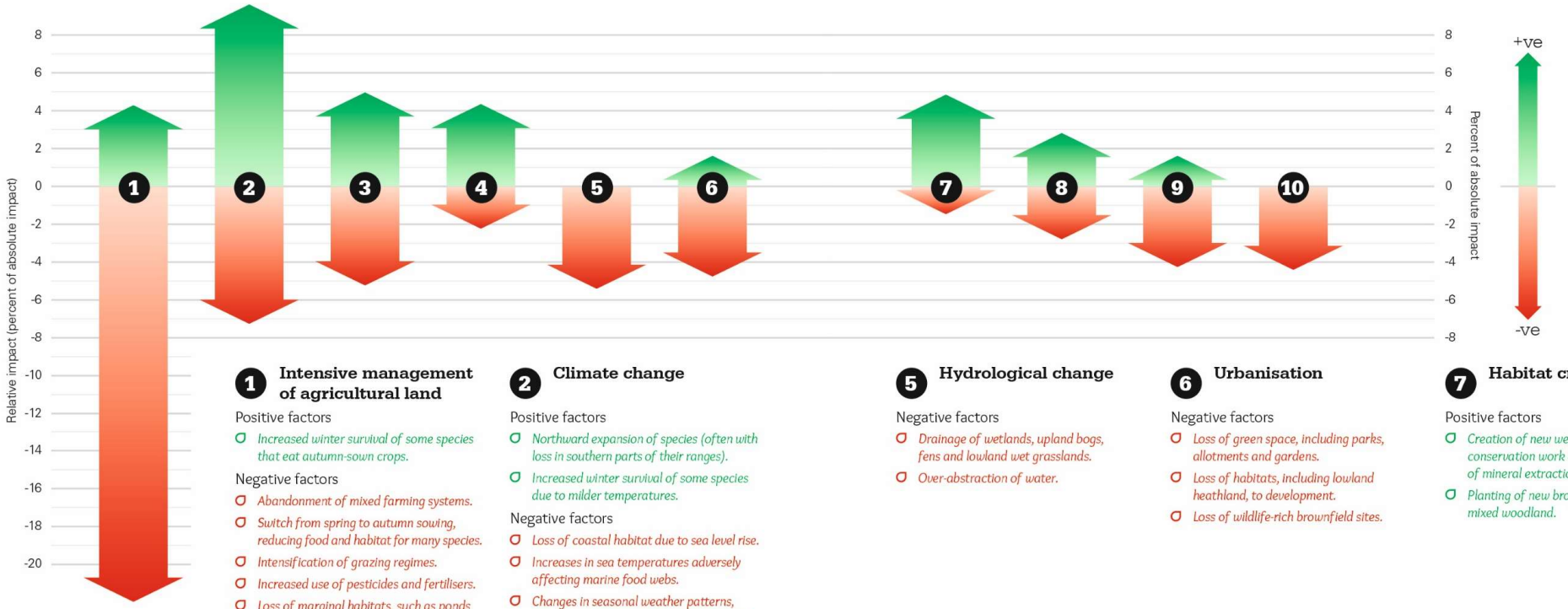

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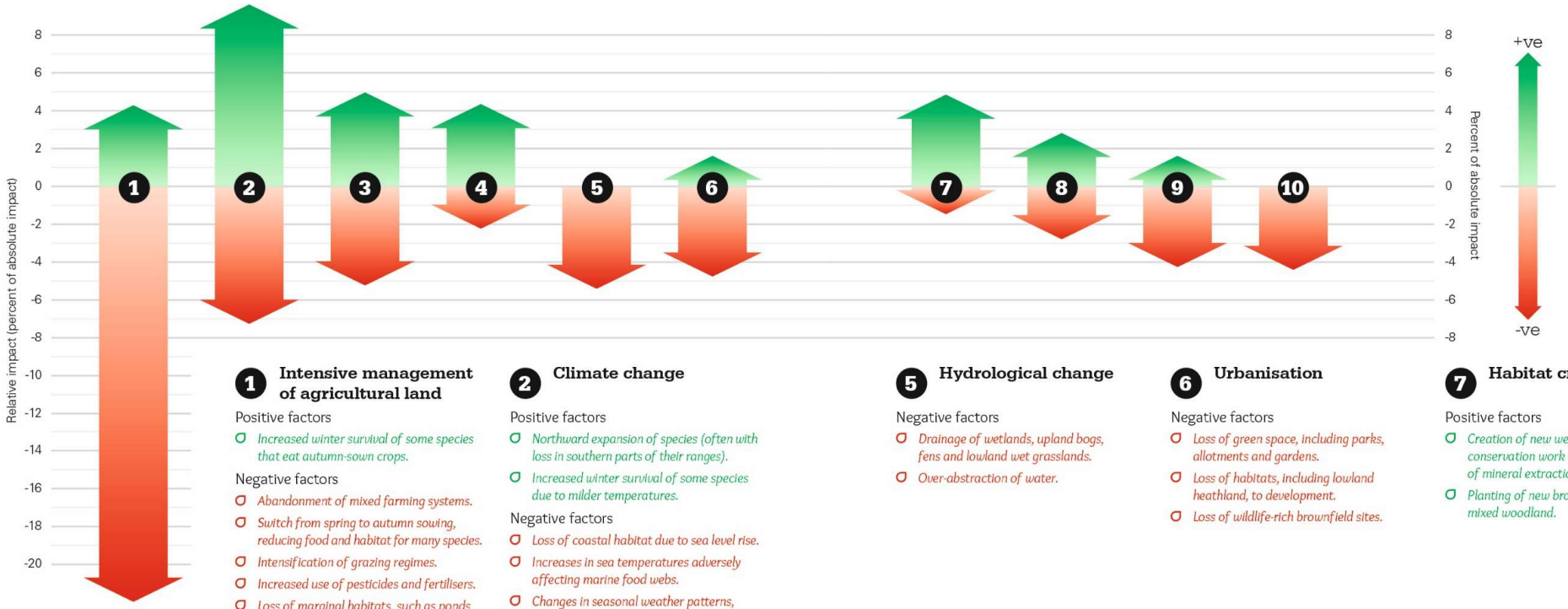

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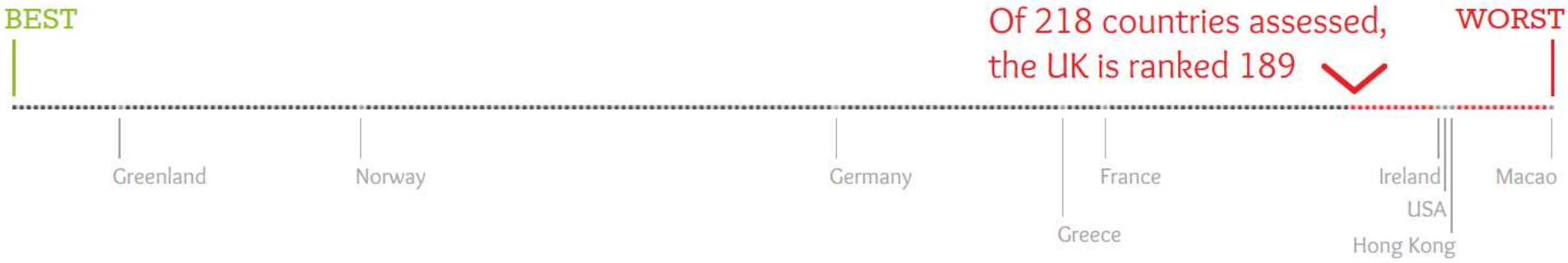


This means that nature is faring worse in the UK than in most other countries.

Newbold et al (2016) Science 353: 288-291

state of nature

State of

The state of farr

Around 75% of the UK's lands
on enclosed farmland, which
grasslands. This enclosed far
and other uncropped areas.

Figure 8
The percentage of species in each trend
between declining species on the left an

Looking at the long-term trend
Among these, 34% showed str
strong or moderate increases.

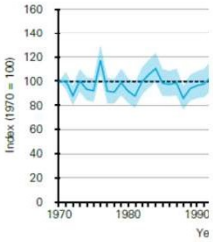


Figure 9
An index of species' status based on abu
for 762 farmland species.

Looking in more detail, the inc
abundance and occupancy of f
fallen by 0.56% per year; a stati
drop of 20% in total, over the l
short-term period, the index d
year; a statistically significant
The short-term decline is not s
to that from 1970 to 2002 (t= -0

Over the long term, our separa
distributional change in vascul
pictured) shows a decline of 7
species), whereas over the sho
a 2% increase (based on 285 sp

Why is woodlan

It was relatively easy to pick out t
major drivers of change in woodl
wildlife from our UK-wide review[5]
both changes in the extent of wood
cover, and in the intensity and type
of woodland management, have ha
substantial effects on the UK's wildl

The **increase in total forest cover**
during our study period, through th
planting of both broadleaved and
coniferous forest, has had a balance
impact overall. Some non-woodland
species have lost habitat to trees,
while other woodland specialists ha
benefitted, particularly from recent
planting of native woodland. Howev
our review also demonstrated that
the management of forest is equally
important, as many species favour
particular management regimes.

Decreasing forest management ha
had a substantial negative impact o
woodland species. In the middle of t
20th century, 50% of our broadleav
woodland was coppice or shrub[6], bu
with the abandonment of traditiona
management methods, such as
coppicing, that figure is now below

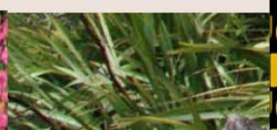
Many woodland species rely on ope
woodland habitats, with access to
sunlight, a varied understorey, and
the mosaic of different habitats
produced by the rotation of coppici
throughout a woodland. The targete
reinstatement of coppicing within
nature reserves, and through grant
schemes, has been successful in
maintaining populations of some
species, although many still suffer
as a result of the limited and
fragmented nature of their habitat.
In addition, management often has
contend with the adverse impacts o
grazing from increasing populations
of both native and non-native deer.

Increases in other forest managem
practices have also influenced wood
wildlife. For example, a decline in th
availability of standing dead wood h
led to a loss of breeding and roostin
sites for bats, as well as habitat for a
host of specialised invertebrates.

UK Cro

UK Ov

- *Over 32,000 native sp*
  and it has been estim
- *To date, 1,557 endem*
  for) have been found
  status assessed.
- *Some 13% of the nati*
  with global extinctio
- *A third of the world's*
  in the OTs.



Sefyllfa Byd Natur 2016
Cymru

sefyllfa byd natur

SoN 2016: key messages

- A single voice
- Nature is amazing
- Pressures upon nature
- Loss of nature
- We can turn it around
- Power of partnership
- Value of volunteers

Hayhow *et al* (2016) The state of nature 2016

SoN 2019: what will it tell us?

- Better metrics
- More understanding
- New ways of framing
- New ways of communicating

More species

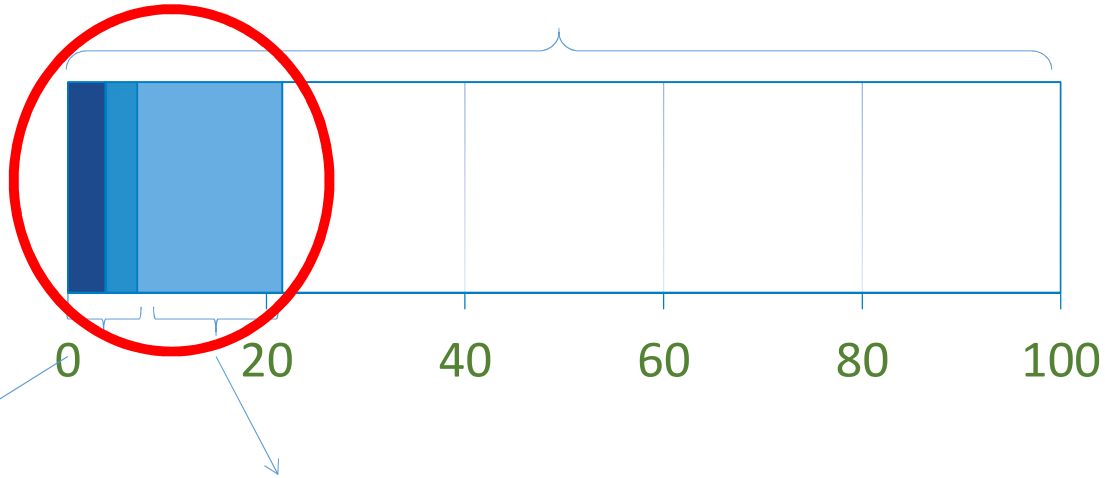
Less bias

Understand-ing habitats

Spatial resolution

Species bias – does SoN scratch the surface?

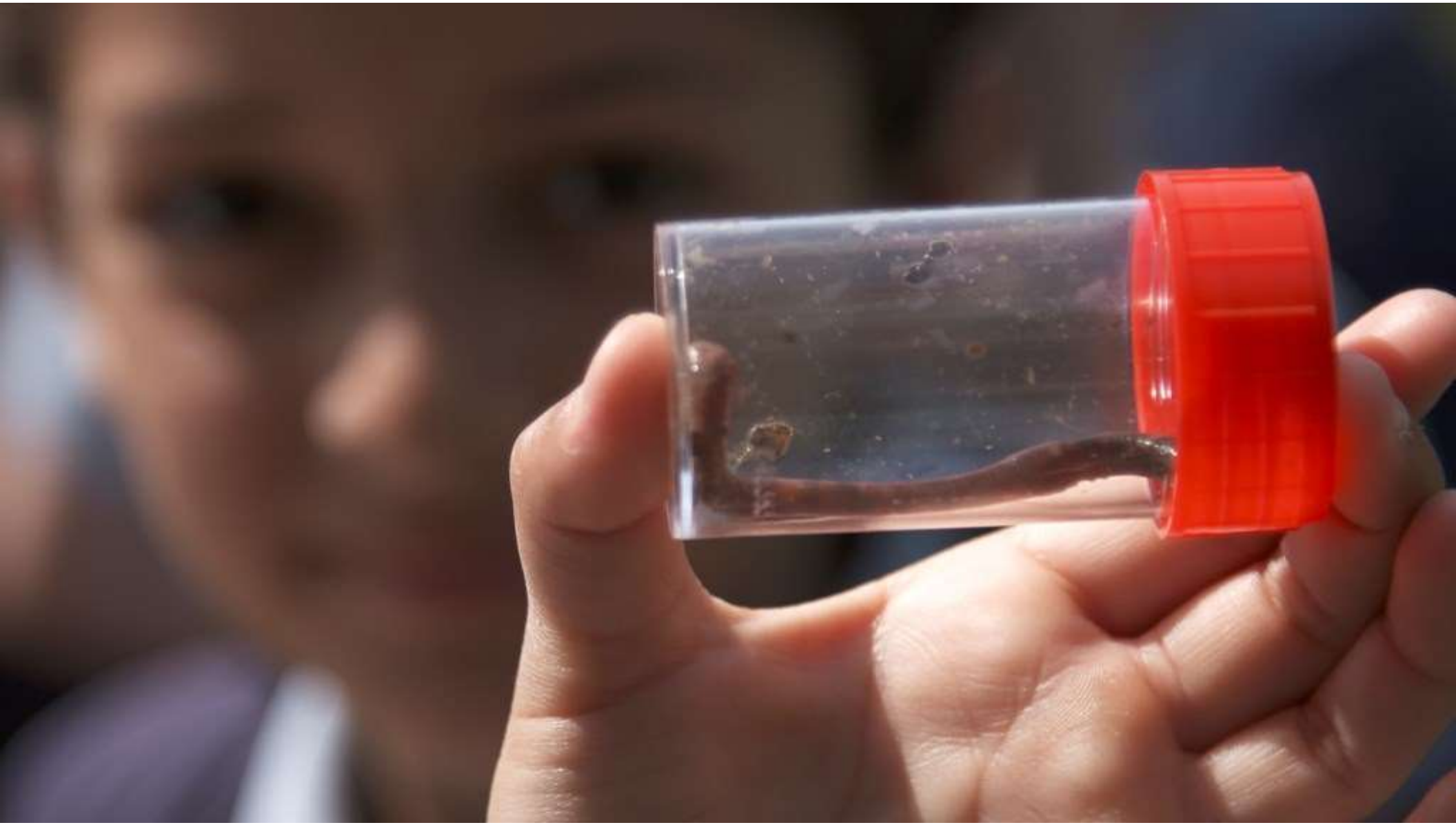
the known knowns and the known unknowns



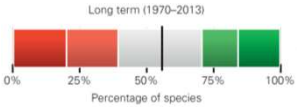
Population change **~7%** of species = 3816

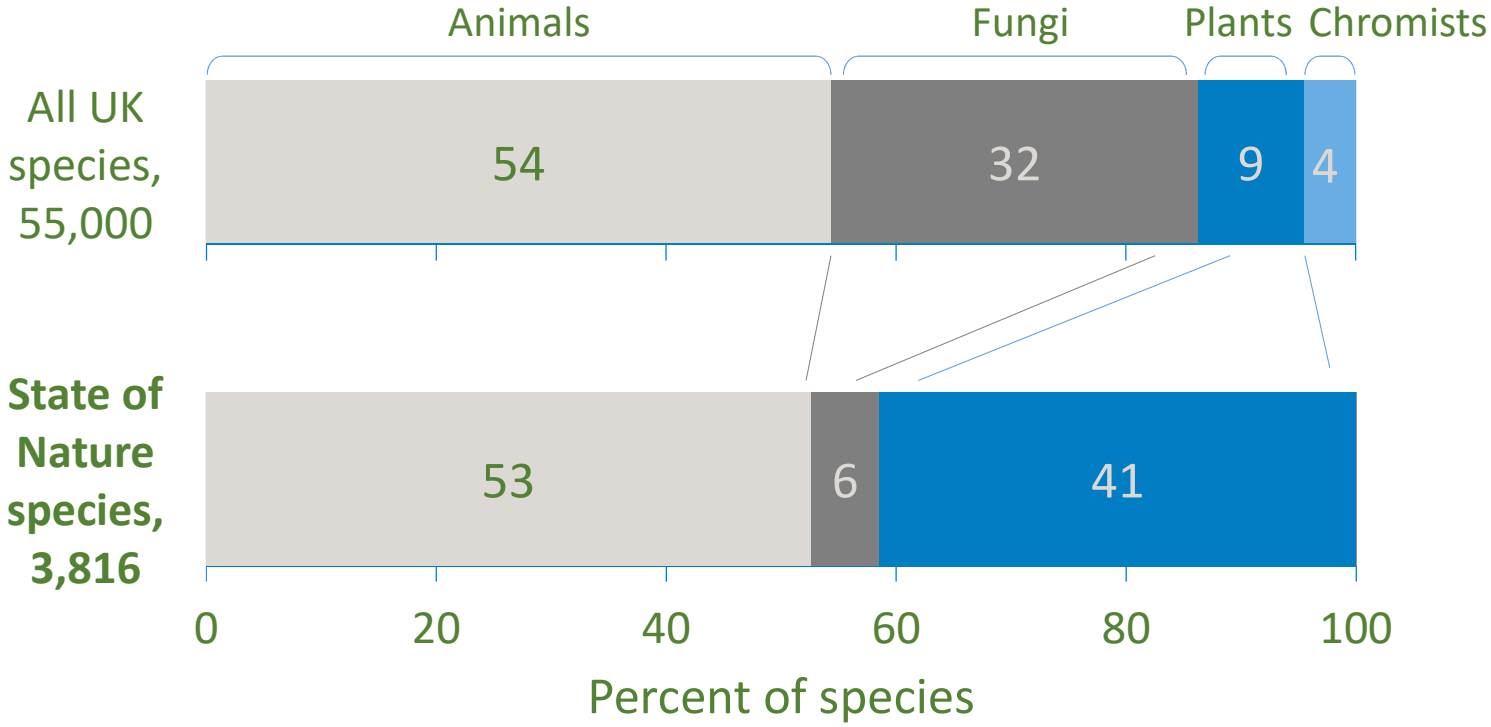
National Red List **~ 15%** of species = 7966

= Information available to the State of Nature

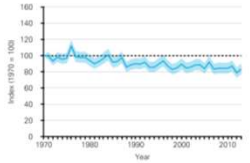


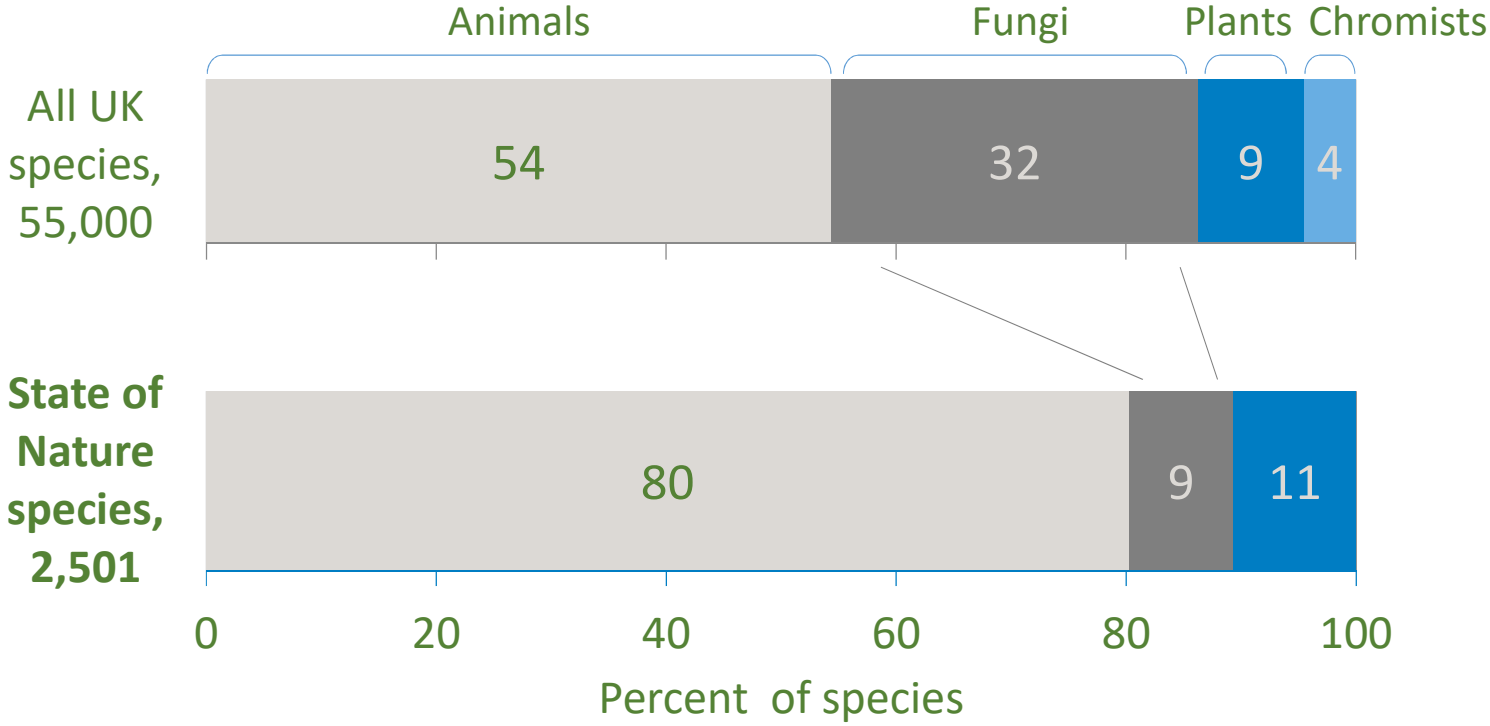
Taxonomic coverage of species - categorical change



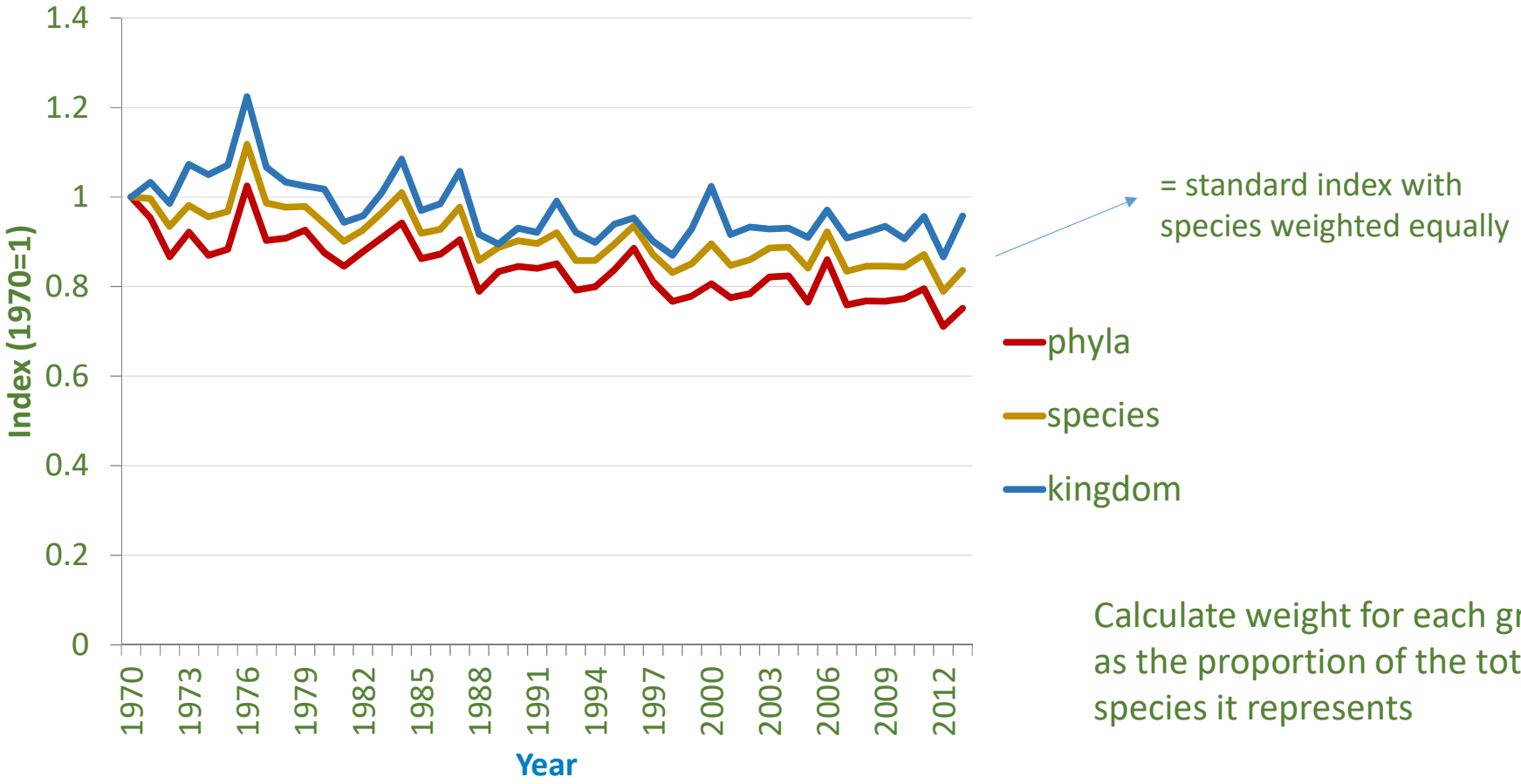


Taxonomic coverage of the population index



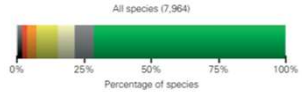


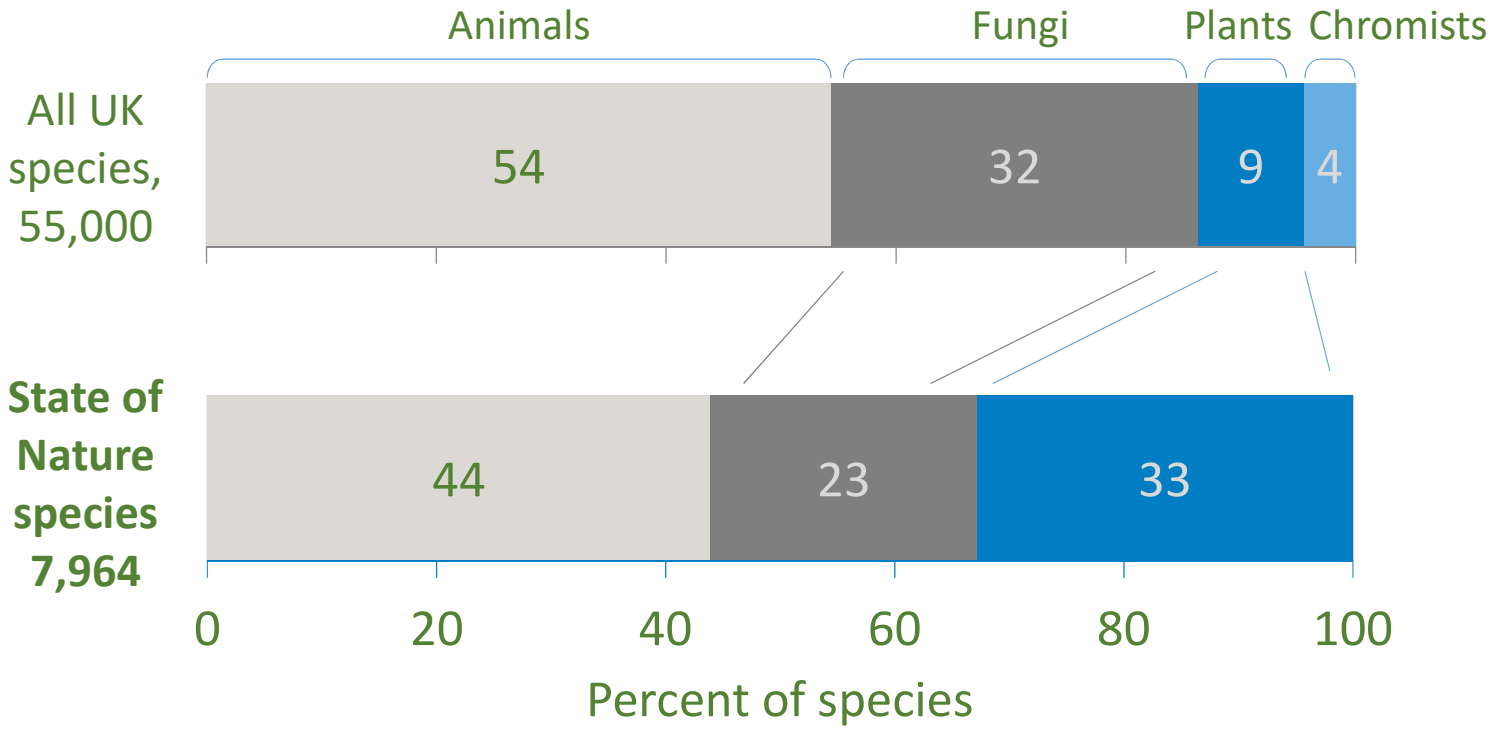
Correcting for taxonomic bias (up- & down-weighting)



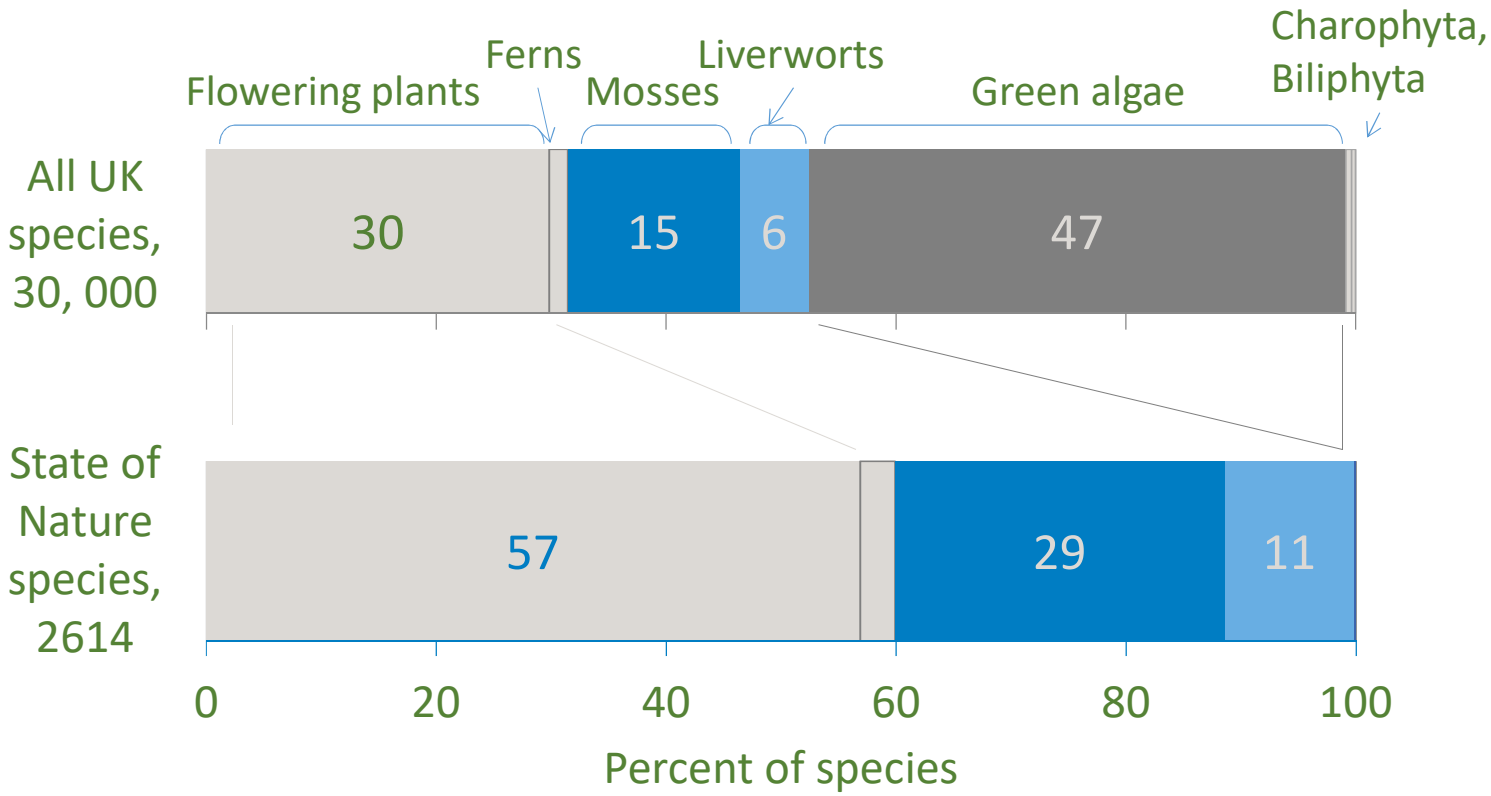
Calculate weight for each group as the proportion of the total species it represents

Taxonomic coverage of red list assessments



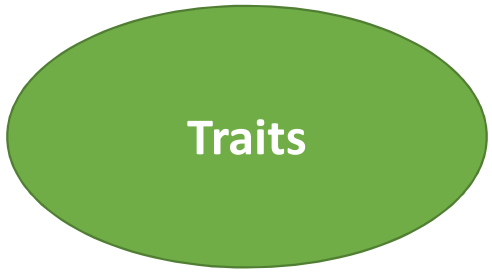


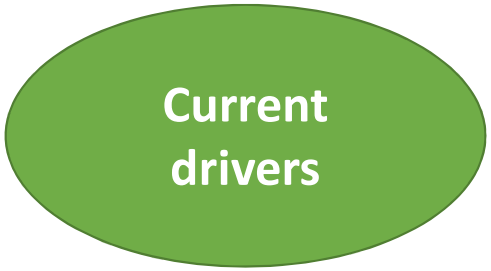
Taxonomic coverage of plant red list



SoN 2019: what will it tell us?

- Better metrics
- More understanding
- New ways of framing
- New ways of communicating





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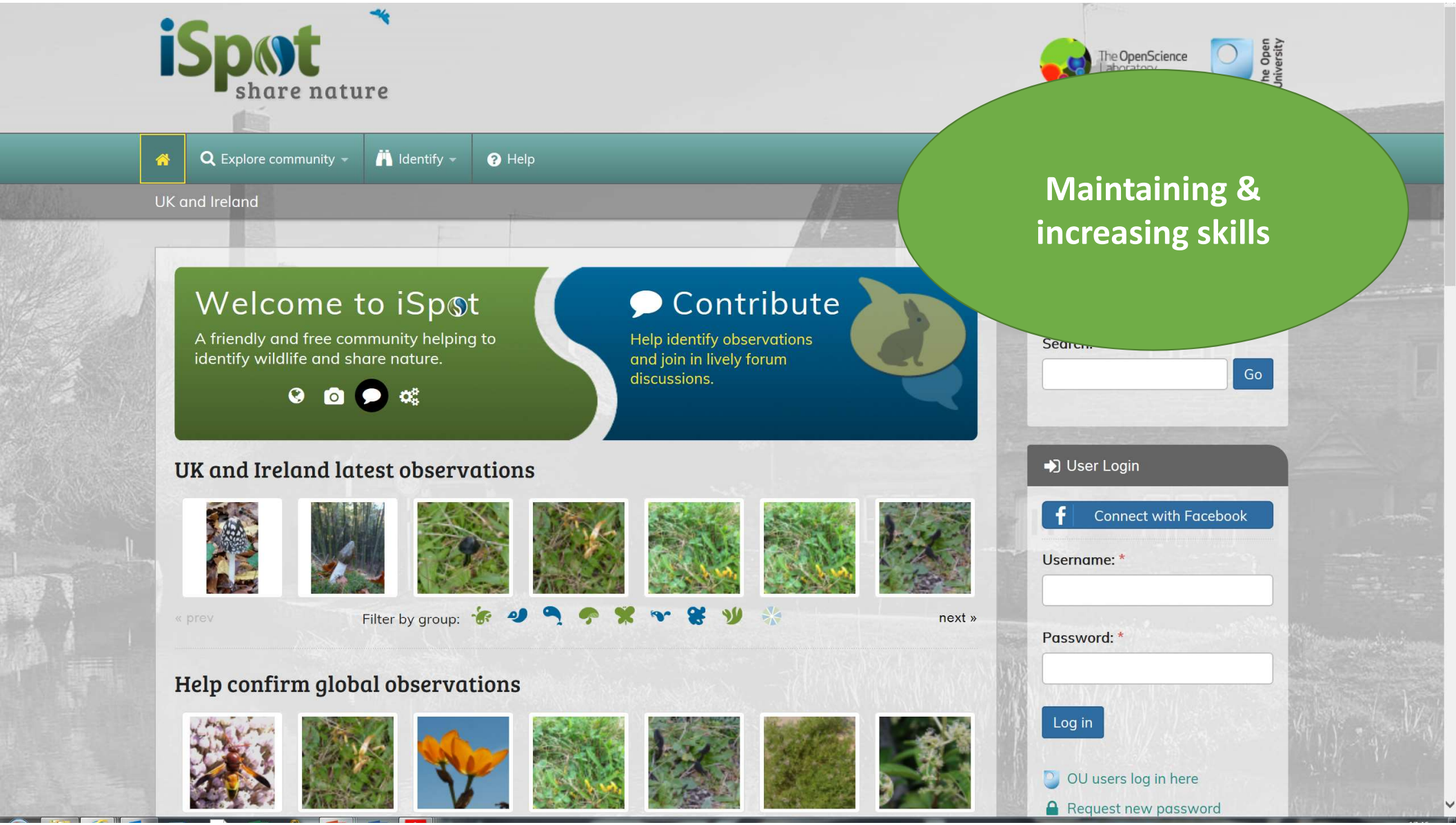
Multiple audiences

Different products?


WWF
RSPB
christian aid
tearfund
CLIMATE JUSTICE NOW
Act fair and fast
Here & Now
CLIMATE JUSTICE NOW!
actionaid
www.actionaid.org.uk
CLIMATE JUSTICE NOW
THE WAVE


Policy
Exchan


iSpot
share nature
The OpenScience Laboratory
The Open University
Explore community
Identify
Help
UK and Ireland
Maintaining & increasing skills
Welcome to iSpot
A friendly and free community helping to identify wildlife and share nature.
Contribute
Help identify observations and join in lively forum discussions.
Search...
Go
UK and Ireland latest observations
« prev
Filter by group:
next »
Help confirm global observations
User Login
Connect with Facebook
Username: *
Password: *
Log in
OU users log in here
Request new password


Make the most of technological developments


Maximising data collection

Influencing recorder behaviour


Engaging & recruiting
future generations


Engaging & recruiting
future generations

The *State of Nature 2016* report is a collaboration between the UK conservation and research organisations listed below:

state of nature

rspb.org.uk/stateofnature